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USSR Report

CHEMISTRY

No. 70

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CONTENTS

AEROSOLS

A Study of the Dispersity of Aerosols Formed from Binary Mixtures 1

Focusing an Aerosol Jet in Narrowing Capillaries 1

ADSORPTION PHENOMENA

Adsorption of Ammonia on Fibrous Carbon Adsorbents 2

Capillary Phenomena and Information on the Porous Structure of Adsorbents. Communication 4. Distribution of the Volume and Surface of Adsorbent Mesopores Based on the Experiments of Capillary Evaporation of Nitrogen and Benzene 2

CHEMICAL INDUSTRY

Novukybyshevsk Petrochemical Combine Expanding Output 4

New Omsk Oil Refinery Built 6

Yakutsk Condensate Refined 8

Georgian Plant to Double Fertilizer Output 9

Fertilizer Production Shortages Affecting Farms 11

Uzbek Ammonia Output to Grow 13

Georgian Plant Augmenting Fertilizer Production 14

Dzhambul Phosphorus Complex 15

Estonian Sulfuric Acid Output Upped 15

Fertilizer From Cherepovets 15

Waste of Hydrolyzable Resources Deplored 16

Biochemical Complex in Kirishi 19

Gasoline From Condensate 19

Polystyrene From Kazakh 19

Polystyrene Production Begins in Omsk 21

"Termoplast" - A Future Automated Plant 22

FERTILIZERS

Problems in Ore Shortages Reviewed 23

Strict Requirements on Karatua Ore Aggravate Phosphorite Shortage 27

Production of Granulated Ammonium Sulfate 30

Production of Granulated Nitrophos in Apparatus with a Fluidized Bed 30

Effects of Chemical Composition and Preparation Methods on the Properties of Coprecipitated Fe_2O_3-CoO-MgO Catalyst in Ammonia Synthesis 31

Preparation of Ammophos and Nitroammophosk from Toolse Phosphorites 31

Production of Fodder Dicalciumphosphate from Nitrophosphate Solutions 32

Studies of the Circulation Method for the Production of Double Superphosphate 32

The Effect of Ammonium Nitrate on the Dehydration Kinetics of Monosubstituted Ammonium Orthophosphate 33

Preparation of Ammonium Sulfate From Spent Sulfuric Acid 34

Influence of Secondary Condensation Temperature on the Productivity of a Large Capacity Ammonia Synthesis Plant 35

Economic Effectiveness of Mineral Fertilizers on Planting of Various Strains of Winter Wheat in the Left Bank Forested Steppe Region of the Ukrainian SSR 35

Superphosphoric Acid - Basic Starting Material in the Production of Liquid Fertilizers 36

Synthesis and Utilization of Dimethylacetamide 36

Production of Vinyl Acetate with the Addition of Active Salt During the Process 37

The Production of O-isopropyl-N-methylthiocarbamate 37

FOOD TECHNOLOGY

Composition of the Lipids in Yeasts Grown on Neutralized Peat Oxidate 38

Continuous Mechanochemical Destruction of Celloligin Polysaccharides on an Experimental M-100 Vibrating Mill 38

FUELS

Utilization of Gaseous Gasoline as a Motor Fuel 39

Enrichment and Dehydration of Coal Tailings with Organic Additives on an Industrial-Experimental Installation 39

ORGANOMETALLIC COMPOUNDS

Reaction of Magnesiumorganic Compounds with Selenophosphoric Acid Chlorides 40

Synthesis of Amidoesters of Arsinous Acids 40

ORGANOPHOSPHORUS COMPOUNDS

Interaction of Acetyldiphenylphosphenite With Tin Tetrahalides 41

Reaction of Introduction of Complexly Bound Dihalides of Tin at the P-O-P Group of Diethylphosphoric and Diphenylphosphenic Acid Anhydrides 41

Mechanism of Interaction of Dimethylphosphorous Monoisocyanate With Benzoylphosphonates 42

Synthesis and Structure of 1, 3, 2-oxaza-4-phospholines 42

Esters of N-(β-oxyethyl)-N-benzylaminomethylphosphonic Acid 43

Complexes of Phenol With Trivalent Phosphorous Acid Amides ... 43

Reaction of 1-trichlorophosphazo-1, 1-dichloroalkanes With Chlorinated Nitriles 44

P^{III}-phosphorylated Acetals 44

IR Spectra and Pecularities of the Effects of Conjugation in Complexes of Phenol With Phosphine Oxides 45

Some Transformations of O, O-dialkyl-1-oxyalkenyl and O, O-dialkyl-1-oxyalkenylphenylphosphonates 45

Phosphorylated Aminothiazols, Aminothiazolines and Aminoimidazolines 46

Interaction of Spatially Shielded Dialkylaminodichlorophosphines With Tert-Butylamine 46

1-dihalogenphosphonylvinylisocyanates 47

A New Method for Production of 2-aminoethylphosphonic Acid 47

2, 6-diphenyl-4-oxo-4-oxy-1, 4-azaphosphorine 48

Synthesis and Properties of Phosphorus-Containing α -chloroesters 48

Synthesis of 4-oxo-1, 3, 2-diazaphosphorinanes 49

Structure of Products of Phosphorylation of Alkenes With Phosphorus Pentachloride in Solutions 49

The Reaction of Cyclic Thiophenylphosphites With Conjugate Carbonyl Systems 50

The Reaction of 2-phenyl-4-methyl-1-phenylhydrazido-1, 2-dihydro-1, 5, 2, 3-phosphaoxadiazol With Benzaldehyde 50

Interaction of N-diethoxyphosphoryltrifluoroacetimidoyl Chloride With Triethylphosphorite 51

Vinyloxychlorophosphoranes 51

Reaction of 2, 6-diphenylpyrillium Perchlorate With Tributylphosphite and Sodium Dibutylphosphoride 52

Reaction of Monoisocyanates of Dialkylphosphorus Acids With Ethylbromopyruvate 52

Interaction of Mono- and Bisphosphorylated Orthoformic Esters With Phosphorus Trichloride 53

Phenylalanine Derivatives Containing Acyl Group of Stereoisomeric N-[tetramethyldiamido(thio)phosphoryl]- and N-[dimorpholido(thio)phosphoryl]-4-aminocyclohexanecarboxylic Acids 53

Isomerization of the S-3-hydroxyalkyl Esters of Cyclic Phosphoric Acids 54

Spectrophotometric Study of the Complex Formation of Potassium Tetrathiocyanopalladite With Some Organophosphoric Compounds in Non-Aqueous Solvents 54

Reaction of O, O-dialkylthiophosphoric Acids With Compounds Containing Carbon-Nitrogen Double Bonds 55

Oxidation-Reduction Reactions of Phosphinic and Phosphinous Acid Halides with Tin Halides Leading to the Formation of Tin Tetrahalide Complexes with Bidentate Organophosphoric Ligands 55

Reaction of Diphenyltrichlorophosphorane With 1, 1-dicyano-2-amino-1-alkenes 56

Halophilic Reactions of Chlorophosphonium Derivatives With Lithium Organic Compounds 56

IR, NMR, ^1H and ^{31}P and Mass Spectra of Phosphorus Containing Substituted Carbamates 57

Reactions of Halocyanomethanes and Halophenyl Methanes With Triethyl Phosphite and Triphenyl Phosphine 57

Reaction of Perfluoroiodoalkanes With Trialkylphosphites. 2 Communication. Calorimetry, NMR ^{19}F and IR Spectra 58

Cyclohalogenation of 3-methyl-1,2,4-pentatrient-1-phosphonic Acid Esters 58

Synthesis and Some Properties of Dialkylamidoalkyl-, Cycloalkyl- and Arylphosphonous Acid Chlorides 59

Synthesis and Structure of Dialkoxythiophosphoryl(bisalkoxycarbonyl-, bisacetyl-, alkoxycarbonylacetyl)methyldi- and Trisulfides 60

The Study of the Association of Phosphoryl Compounds With Proton Donors Based on the ν(P=O) Frequency in their Spectra 60

Formation of Bicyclic Phosphorus Containing Heterocycles During Chlorination of Dialkyl Esters. 1-chloro-2-(1-cyclohexenyl)-ethenephosphonic Acid 61

Intramolecular Heterocyclization of Phosphazo Compounds 61

S-phosphorylation of Dichloroacetic Acid Esters With Phosphorus Trichloride 62

Phosphorus Containing Inamines 62

Synthesis of Cyclic Phosphorylated Acetals - Derivatives of Tetrahydropyrane 63

Effect of the Ring Size on Reactivity of Cyclopolyphosphines.. 63

Synthesis of Trivalent Phosphorus Compounds Containing α -carboalkoxymethyl Group 64

Synthesis of 1,8-naphtylene Phosphites 64

A Synthetic Method for the Production of Nitrophospholene Oximes 65

Synthesis of N-arylamino Derivatives of Benzyldiethylphosphine Oxide 65

Reaction of N, N'-diacetyl-1, 4-diamino-2, 3-dihydroxybutane With Hexaethyltriamide of Phosphorous Acid 66

Some Complexes of Hexaalkyltriaminobenzylphosphonium Salts 66

The Effect of Phosphorus Containing Substituents on the Color of Azodyes 66

The Spatial Structure of 2,2-dimethyl-5-alkyl-5-thiono-1,3,2,5-dioxasilaphosphorinanes 67

Interaction Between Dithioacids of Phosphorus and Their Aniline Salts, On the One Hand, and the Isonitriles, On the Other 67

Spatial Structure of Phosphorus-Containing Heterocyclic Rings. XIV. Internal Rotation of the Phenyl Ring in 2-phenyl-1,3,2-dioxaphosphorinanes as Determined by the Kerr Effect Method 68

Reaction Between Organic (Chloroethinyl) Sulfides and Trialkylphosphites 69

Basicity of Phosphorus-Containing Iminoesters 69

Kinetics of the Reactions Between the Hydrazides and Alpha-Ethylhydrazides 70

Addition of Diethylphosphite to Acrolein Diethylacetal 70

Unsaturated Organophosphorus Compounds in the Heterocyclic Series. II. Synthesis of 2, 6-diphenyl-3-methyl-4-dialcoxythiolphosphonoethynylpiperadine-4-ols 71

A Study of the Transformation of Dialkyl Esters of 1-methyl-1, 2-epoxyethylphosphinic Acid 71

Unsaturated Organophosphorus Compounds in the Heterocyclic Series, IV. Synthesis of 2, 6-diphenyl-3-methyl-4-(2-dialkylphosphonethenylidene)piperadines 72

AEROSOLS

UDC 541.182.2/.3.539.215.4

A STUDY OF THE DISPERSITY OF AEROSOLS FORMED FROM BINARY MIXTURES

2. The Relationship of the Aerosol Dispersity to Vapor Supersaturation

Moscow KOLLOIDNYY ZHURNAL in Russian No 1, 1980, submitted 18 Dec 78, signed to press 6 Jan 80, pp 127-131

ISMAGILOV, F. P., KIVA, V. N., MASAGUTOV, P. M., and BEKSHENEVA, N. M., Scientific Research Institute of Petrochemical Productions, Ufa

[Abstract] The dispersion composition of an aerosol from a mixture of dialkyl phthalates forming upon emission of a vapor-gas mixture from a nozzle with different content of vapor in the jet and initial temperature was studied. Findings were compared with previous data and interpreted with consideration of the difference in the equilibrium composition of the vapor and the condensed phase of the binary mixtures during formation of an aerosol. The study showed existence of a linear dependence between the dispersity of the binary mixture of dialkyl phthalates and the logorithm of supersaturation of the vapor. References: 4; Figures: 4.
[132-2791]

UDC 533.6.011:532.525:541.182.2/3

FOCUSING AN AEROSOL JET IN NARROWING CAPILLARIES

Moscow KOLLOIDNYY ZHURNAL in Russian No 1, 1980, submitted 12 Aug 78, signed to press 6 Jan 80, pp 114-117

BYKOVSKIY, Yu. A., KOLESOV, V. L., MANYKIN, Ye. A., NAKHUTIN, I. YE., POLUYEKTOV, P. P., RUBEZHNYY, YU. G. and SIPAYLO, I. P.

[Abstract] Experimental data and a theoretical model which permits interpretation of the focusing of a debutylphthalate aerosol jet in a narrowing capillary were presented. The experimental study traced the course of aerosols in conical capillaries and the focusing of a jet in dependence on the pressure at the capillary inlet, the parameters of the capillary and the sizes of particles. Experiments were conducted with polydispersed and monodispersed aerosols. It was established that there are maximum diameters of the outlet cross-section of the conical capillary which permit focussing (of the order of 120 mkm.). At lesser dimensions of the capillary focusing of the jet is possible but focusing disappears at Reynolds' numbers $\gtrsim 500$. Large particles were focused earlier than small particles. References: 6; Figures 5.
[132-2791]

ADSORPTION PHENOMENA

UDC 541.182+541.49

ADSORPTION OF AMMONIA ON FIBROUS CARBON ADSORBENTS

Minsk IZVESTIYA AKADEMII NAUK SSSR--SERIYA KHIMICHESKIKH NAUK in Russian
No 6, 1979 pp 45-49

BRUN'KO, T. G., YERMOLENKO, I. N., LAZERKO, G. A., and MOROZOVA, A. A.,
Belorussian State University imeni V. I. Lenin, and the Institute of
General and Inorganic Chemistry, Academy of Sciences Belorussian SSR

[Abstract] A gravimetric method (quartz balance in vacuo) was used to study the uptake of ammonia by various samples of fibrous carbonaceous sorbents differing in capacity and pore size. The results showed that in samples with a combustion loss of less than 30% adsorption of ammonia was not determined by the total pore volume, but by pores with a critical size of 5-6 Å. Modification of the activated carbon fibers with aqueous salt solutions showed that scarcity and selectivity for ammonia was most markedly improved in the case of carbon samples with higher combustion losses and critical pore size in the 10-16 Å range. An equation was derived for the absorption isotherm ($a = kp^n$ where a is the adsorption volume in mg/g, p is the pressure of ammonia in mm Hg, and k and n are constants). Heats of adsorption for ammonia were derived from the isotherm equation and adsorption equilibria. In the temperature interval 20-125° C heat of adsorption was independent of the temperature. Tables 1; Figures 4; References 10: 2 Belorussian, 4 Russian, 4 Western.
[94-12172]

UDC 541.183

CAPILLARY PHENOMENA AND INFORMATION ON THE POROUS STRUCTURE OF ADSORBENTS. COMMUNICATION 4. DISTRIBUTION OF THE VOLUME AND SURFACE OF ADSORBENT MESOPORES BASED ON THE EXPERIMENTS OF CAPILLARY EVAPORATION OF NITROGEN AND BENZENE

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 2,
Feb 80 pp 238-243 manuscript received 28 Nov 78

M. M. DUBININ and L. I. KATAYEVA, Institute of Physical Chemistry, USSR
Academy of Sciences, Moscow

[Abstract] Using two adsorption systems N_2 (78K) and benzene (293 K) for which capillary evaporation has been studied in detail, t and r values were calculated by three methods: the classical Kelvin equation, the Broekhoff and deBoer equation, and its modification, in which the relationship between surface tension and meniscus curvature of the liquid was considered. The tables of calculated data for experimental p/p_s values

made it possible to calculate quite accurately the thickness of adsorption layers and the radii of the pores being emptied. The effect of adsorption on capillary evaporation was manifested by a shift of the differential distribution curves of mesopore volumes towards larger radii. Using the example of capillary evaporation of benzene from silica gel mesopores, it was shown that the Broekhoff and deBoer method yields better values for the specific surface of silica gel than the classical Kelvin equation. Figures 2, references 11: 6 Russian, 5 Western.
[127-7813]

NOVOKUYBYSHEVSK PETROCHEMICAL COMBINE EXPANDING OUTPUT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Mar 80 p 1

[Excerpt] During the first 4 years of the five-year plan period, the output of Novokuybyshevsk enterprises totaled 4 billion rubles, more than a third of which earn the state mark of quality; and these are mostly petroleum products.

The Petrochemical Combine imeni 50-letiya SSSR is one of the largest enterprises producing ingredients for the production of synthetic rubber not only for domestic consumption but also for Europe. The combine's product is in high demand. The best foreign companies buy it with satisfaction.

The enterprise is both growing and developing. During the current quiquennium, its output is doubling; and the volume of items earning the mark of quality will increase by 50 percent.

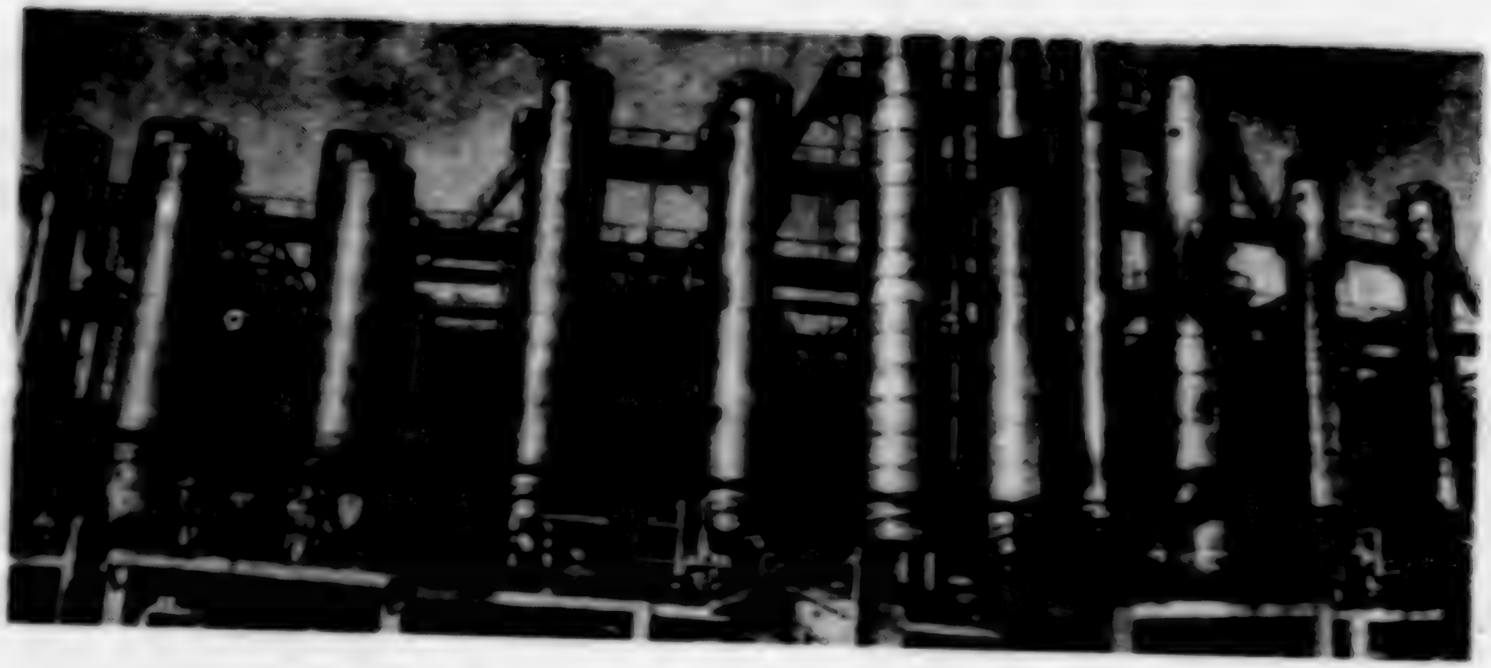


Photo shows installations of Shop No 3 of the Tetrochemical Combine, where the most modern technology is used in the production of butadiene--a valuable substance in the production of finished rubber.
[164-P]

NEW OMSK OIL REFINERY COMPLEX BUILT

Moscow IZVESTIYA in Russian 29 Mar 80 p 1

[Article by A. Matveyev: "They Kept Their Word"]

[Text] A new oil refinery complex was accepted for operation at the "Omsknefteorgsintez" Production Association. The large volume of construction and installation work has been completed. Having pledged to commission the complex by the eve of the 110th anniversary of V.I. Lenin's birth, the Omsk "Glavomskpromstroy" Main Production Construction Trust kept its word. The facility was turned over to the operators, who decided to quickly put the complex on stream.
[178-P]

YAKUTSK CONDENSATE REFINED--Yakutsk. L. Kapelyushnyy. Until recently, black clouds curled over the Mastakh gas deposits in Yakutiya. It was gas condensate being burned. Gas condensate is the natural mixture of gasoline and diesel fuel. The first experimental installation for recovering condensate was constructed by specialists of the Yakutsk "Yakutskgazprom" Gas Industry organization. The apparatus is simple and was assembled from readily available equipment. It was put on stream in 1979 and produced fuel which is every respect equal to gasoline A-76. Production of furnace fuel oil which met all requirements was also begun. The cost of a ton of gasoline made from condensate is considerably less than a ton of imported fuel. "Yakutskgazprom" specialists also are planning to organize the refining of condensate at the Srednevilyuy gas deposits. The fact that all motor vehicles of the gas industry organization already use its own fuel speaks for the efficacy of refining gasoline from the gas. [Text] [Moscow IZVESTIYA in Russian 5 Mar 80 p 1] [169-P]

GEORGIAN PLANT TO DOUBLE FERTILIZER OUTPUT

Moscow IZVESTIYA in Russian 19 Feb 80 p 1

[Article by A. Dzhioyev: "Capacity Will Double"]

> [Excerpt] Rustavi, Georgian SSR. New facilities for the production of nitric acid and ammonium nitrate have been put on stream at the Rustavi Chemical Plan. The first product, ammonia, has been produced.

In a short time, a production complex equal to a whole fertilizer plant was built in Rustavi. Materials and equipment from almost 300 cities was received at the important construction site of the Tenth Five-Year Plan. Representatives from many republics and oblasts including more than 500 persons sent from various trusts of the USSR Ministry of Installation and Special Construction Work from Moscow, Voronezh, Baku, Tiraspol' and Rostov-on-Don had helped the Georgian construction and installation workers in erecting the engineering and technical facilities.

To permit the installers to begin their work, construction crews laid foundations of intricate configuration under the compressors twice as fast as the norm, worked three shifts and completed the set task.

V. Timofeyev, deputy chief engineer of the "Spetsmashmontazh" Special Machinery Installation and Construction Association, was interviewed at the unit for removing sulfur contaminants from natural gas.

"Although small and shaped like a samovar, the unit is very complex and filled with technical equipment. V. Bykov's installation crew from the Kaliningrad Installation Administration assembled it from start to finish. Superior mastery permitted the outstanding crew to complete the expanded work program under tight schedules and to turn over the purification unit for acceptance from its initial submission."

The large construction site became a school of advanced experience. Examples of creative approach to the job have been demonstrated more than once by subdivisions of the Rustavi Administration of the Georgian "Gruzmekhanomontazh" Machinery Installation Trust. The biggest result was achieved at the installation of the very heavy technological equipment. Thus, the 18-ton synthesis column was erected with a special crane and counterweights slung through a block; and the carbon monoxide converter was entirely assembled on the gound and then erected with two paired cranes.

A huge granulator tower and technological columns prominently pointing to the sky were also built. Many kilometers of elevated structures for intershop utility conduits were also erected. The city of Georgian metallurgists has acquired a new profession--it can now also be called a city of chemists. Once the complex attains its designed capacity, fertilizer production will almost double.
[171-P]

FERTILIZER PRODUCTION SHORTAGES AFFECTING FARMS

Moscow EKONOMICHESKAYA GAZETA in Russian No 9, Feb 80 p 18

[Article by N. Gubenkov: "With a Zero Remainder..."]

[Text] Khar'kov. The Khar'kovskaya Oblast "Obsel'khozkhimiya" Agricultural Chemistry Production Association (S. Krasnikov, chairman) has been operating since the beginning of the year. It sees its primary task as the timely supply of mineral fertilizers in their full variety to sovkhozes and kolkhozes for spring sowing and for presowing cultivation.

But already at this early stage, its efforts are confronted with serious difficulties. As a check has indicated, many farms have entered the new year with no fertilizers left on hand. This occurred because last year only 10 of the 32 chemical plants fulfilled their contract obligations for fertilizer delivery. The greatest liability was for ammonium nitrate, which is absolutely essential for early spring top dressing of winter crops. The main supplier of this fertilizer is the North Donets "Azot" Production Association (B. Leshchinov, general director). Having fulfilled the annual shipment plan only 86 percent, it failed to deliver 14,000 tons of fertilizers to the farms in the oblast.

The oblast also failed to receive 11,000 tons of phosphate fertilizer. The Suma "Khimprom" Chemical Industry Production Association (A. Kravchenko, general director) has especially large deficits in the delivery of granulated superphosphate totaling 2,500 tons and of ammophos amounting to about 3,000 tons.

Significant shortages in deliveries of potash fertilizers were also tolerated. The deficiency totaled almost 6,000 tons. The Stebnik Potash Plant in L'vovskaya Oblast and the Ural "Uralkaliy" Potash Production Association in Perm'skaya Oblast had the worst deficit of all. Overall, Khar'kovskaya Oblast failed to reveive about 110,000 tons of fertilizers, i.e., 18.3 percent of the planned total deliveries.

What especially disturbs Khar'kovites is that the beginning of the new year was not marked by an increased flow of fertilizers to the village. Managers of industrial enterprises must take all measures to eliminate the deficiency in the shortest time possible; and, in the future, to deliver fertilizers with regularity.
[165-P]

UZBEK AMMONIA OUTPUT TO GROW--Fergana. For the first time in Uzbekistan, a high capacity reactor column weighing 1,500 tons was erected in the construction of an ammonia production facility of the Fergana Nitrogen Fertilizer Plant. The column is the heart of a standardized unit which will produce 400,000 tons of ammonia annually. Specialists from Moscow are usually invited to set up these giants; but this time, E. Seytzhemilev's crew from the Fergana Installation Administration of the "Neftezavodmontazh" Petroleum Refinery Installation Trust were able to do the work unassisted. The planners' precise calculations ensured complete success, and the unusual erection of the giant was accomplished in 2.5 hours--less than a third as long as is required by the norm. I. Kostin. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Mar 80 p 2]
[167-P]

GEORGIAN PLANT AUGMENTING FERTILIZER PRODUCTION

Moscow PRAVDA in Russian 13 Jan 80 p 2

[Article by G. Lebanidze: "Flags Over Shops Begotten by Competition"]

> [Excerpt] Construction and installation work on a complex of shops for the production of mineral fertilizer has been completed at the Rustavi Chemical Plant. Start-up work on the new facilities for the production of ammonia, dilute nitric acid and ammonia silicate has begun. Once the new complex is operational, up to half a million more tons of fertilizer will be available to agriculture. The capacity of the enterprise will be augmented by 80 percent.

"The volume of work completed at the site is huge," declared K. Gogichaishvili, manager of Trust No 1 of the Georgian SSR Ministry of Construction; "during a short time span, 1,200 large machines and units, 10,000 tons of metal structures and 50,000 cubic meters of precast reinforced concrete were installed."

All work was completed significantly ahead of plan, including a large absorption column, which was assembled a month ahead of schedule.

Competition among construction crews is led by the crew building the dilute nitric acid shop. Installers from the Rustavi Administration of the Georgian "Gruzmenkhanomontazh" Machinery Installation Trust assembled the equipment; they were assisted by highly qualified moscovite specialists from the Start-up Administration of the "Tsentrotekhmontazh" Central Technology Installation Trust. The work is very complicated. The shop will use new domestic technology including facilities for trapping waste gases. This means that the envoronment will not suffer.

In a short time, fertilizer produced in the new shops of the Rustavi Chemical Plant will be shipped to all parts of the Soviet Union.
[168-P]

DZHAMBUL PHOSPHORUS COMPLEX--Dzhambul. The Karatay-Dzhambul Territorial Production Complex, which is being built in compliance with the Directives of the 25th Party Congress, will accelerate the development of the USSR phosphorus industry. The first stage of the future head enterprise, the Novo-Dzambul Phosphorus Plant, has been constructed. By putting the fourth electrothermal furnace into operation, the designed annual capacity of the enterprise was raised to 110,000 tons of yellow phosphorus. In accepting the scheduled technological complex, the operators decided to put it on stream 6 months ahead of schedule. The new industrial district, the formation of which will be completed in the next quinquennium, will acount for more than 90 percent of domestic phosphorus production. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 3 Feb 80 p 1]
[179-P]

ESTONIAN SULFURIC ACID OUTPUT UPPED--A sulfuric acid production shop with an annual capacity of 500,000 tons has been put on stream at the "Slantsekhim" (Shale Chemical) Production Association imeni V. I. Lenin in the city of Kokhtla Yarve. [Excerpt] [Moscow EKONOMICHESKAYA GAZETA in Russian No 9, Feb 80 p 18]
[166-P]

FERTILIZER FROM CHEREPOVETS--Cherepovets. V. Krukovskiy. Since the start of the five-year plan, the ethylbenzene shop of the Cherepovets Nitrogen Fertilizer Plant produced 200,000 tons of nitrogen fertilizer, including more than 13,000 tons above the planned volume. The chemists achieved this success because of improved servicing of technological equipment and shortening of planned preventive maintenance periods. For 2 years, the shop's entire output has been stamped with the mark of quality. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 22 Mar 80 p 1]
[177-P]

WASTE OF HYDROLYZABLE RESOURCES DEPLORED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Apr 80 p 2

[Article by Ye. Peshko, deputy director of the Krasnoyarsk Biochemical Plant: "Expensive Scrap"]

[Text] Krasnoyarsk. The Krasnoyarsk "Krasnoyarskgidrolizprom" [Hydrolysis Industry] Association produces ethyl alcohol and protein feed yeasts, both of which are in great demand in the national economy and both of which are derived from ordinary wood scrap and chips. By-products of woodworking and timber milling are overabundant in Krasnoyarskiy Kray. In Lesosibirsk, for example, this secondary raw-material stock rots in dumps; it is burned in bonfires or, in the best case, in boiler furnaces; while at the very same time, railroad consists with wood scrap travel hundreds and thousands of kilometers from neighboring oblasts to Krasnoyarsk.

Qualitywise, wood scrap from Kemerovo is in no way different than similar wood scrap from the Krasnoyarsk Lumber Industry Complex. The difference is in the cost of transportation; and everyone is cognizant of the heavy density under which the Siberian railroads operate; and it is precisely because of the shortage of rolling stock that users are short annually about a million cubic meters of lumber cut in the Angara and the Yenisey regions.

Logic dictates that secondary wood resources should be more fully utilized locally. There is more than enough scrap in Krasnoyarsk itself. In 1979, Lumber Mill No 2 of the Krasnoyarsk "Glavkrasnoyarskstroy" Main Trust (Sobolev director) had considerably overfulfilled the plan for the delivery of hydrolyzable material stock to the biochemists. It would seem that this enterprise would deserve all kinds of praise. But let us not be hasty with conclusions. City dwellers constantly see one truck after another loaded with small trimmings and a rack pass the biochemical plant headed from the lumber mill toward the dump. The cargo could have also been used in hydrolysis.

The Krasnoyarsk "Krasnoyarskmebel'" Furniture Association is also considered a major supplier of wood material; but only a third of its production scrap is put into further use. The rest is burned in boiler furnaces.

As far back as 1970, the Krasnoyarskiy Kray Kraykom directed the local lumber mill combine to convert the boiler room from wood to another form of fuel. According to the most conservative estimates, conversion to burning low grade lignite would have not only saved 150,000 cubic meters of hydrolyzable material stock, but would have also brought the combine an annual profit of 300,000 rubles. However, the enterprise has still not rebuilt its boiler room and even does not have a project to do so.

A large amount of unutilized stocks also exists at the Krasnoyarsk Timber Handling Combine, on whose territory mountains of wood scrap have accumulated. This excellent material stock for the biochemical plant rots simply because the combine does not want to organize sorting of wood scrap. What needs to be done is to separate large pieces from the soft mass at a specific technological stage of the sawing operation.

Once the biochemists were the sole users of hydrolyzable wood scrap. But in recent years, we have acquired a major competitor: the construction industry where brick yards use the scrap as filler and where lignite (the by-product of hydrolysis) can replace wood scrap. The Zykovo Brick Yard has made the switch already 20 years ago and now realizes a profit of 2 rubles for each cubic meter of material stock.

Many large Krasnoyarsk industrial enterprises -- including the Krasnoyarsk Metallurgical Plant, the shipbuilding yard and the Yenisey Chemical Combine -- have their own saw mill shops. They could also become suppliers of material stock for hydrolysis, but do not want to snarl themselves up with every kind of "trifles."

Local resources of hydrolyzable material are manifestly limitless; they must only be skillfully utilized. The solution of the problem must in the first place be undertaken by the Krasnoyarsk "Lesosnabsbyt" Timber Supply and Sales Organization. Its managers are now at a loss as to how to provide material stock for the rapidly growing capacities of the biochemical plant. In 1980, 90,000 cubic meters (according to their estimates) of wood scrap and commercial chips must be hauled in from the outside. This will require hundreds and hundreds of railroad cars. But "Lesosnabsbyt" does not even want to hear about local material stocks going to dumps, to furnaces and to bonfires.

This organization considers stocks of hydrolyzable material only on the basis of understated data provided by the suppliers, i.e., by lumber mills and woodworking enterprises. Actual accounting for and monitoring of efficient use of valuable wood scrap in Krasnoyarskiy Kray do not exist.

Monitoring can be set up however. Norms for estimating the output of hydrolyzable materials exist; those suppliers who do not satisfy these norms should be fined. But the setting of work orders on the saw operator should only occur under the condition where the saw mill and the other enterprises completely turn over their by-products to the biochemists.

Many timber procurement establishments have received additional tasks calling for the production of commercial wood chips. This means timber will be felled and new capacities for reprocessing of secondary material stocks of wood will be created. The railroad, of course, will incur the burden of additional haulage.

Meanwhile, dump trucks haul hundreds of thousands of hydrolyzable materials to the Krasnoyarsk dump.
[170-P]

BIOCHEMICAL COMPLEX IN KIRISHI--Kirishi. In the snowy winter of 1960, construction workers arrived at the shore of the ancient Volkhov River. At the beginning, there were only 300 men and women who began the huge construction project--virtually from nothing. But in just 2 years, the first shop of the petroleum refinery was put into operation. In December 1965, the refinery accepted crude; and soon the first shipments of mazut departed Kirishi: the young city had supplied its first fuel to the country. Soon the news spread of another accomplishment in Kirishi--the production of BVK, the protein and vitamin concentrate which increases milk yields. This product permits stock and poultry raisers to realize more than 100 million rubles worth of additional output in milk, meat and eggs. Only 2 years were required to build and to put the "Biokhim" Biochemical Plant on line, i.e., a year ahead of schedule. Contemporary Kirishi is the center of a large energy and industrial complex in the northwest. High-capacity facilities of the head enterprise of the Kirishi "Kirishinefteorgsintez" Petroleum Organic Synthesis Association refines millions of tons of the "black gold" annually and supplies hundreds of domestic enterprises with petroleum products. The construction of the second state of "Biokhim" is being completed. [Excerpt] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Apr 80 p 1]
[172-P]

GASOLINE FROM CONDENSATE--Moscow. D. Pak. The All-Union Scientific Research Institute for Natural Gases has developed equipment which makes possible derivation of gasoline and diesel fuel directly from gas condensate. The equipment's advantages are low cost, fast manufacture and installation, and compactness. Utilization of the new equipment at the Urengoy Gas Condensate Deposits will result in a savings of more than a million rubles. At present, the institute is developing a standardized compact unitized facility for processing gas condensates of various quality into engine fuels. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Jan 80 p 2]
[175-P]

POLYSTYRENE FROM KAZAKH--Shevchenko, Kazakh SSR. (V. Burenkov.) Construction crew leader V. Dostavalov gave D. Brazhnik, chief engineer of the plastics plant now being built in Mangyshlakskaya Oblast, a hard-hat filled with silvery threads. This hearalded the addition of polystyrene

to the list of chemical products now produced in the Kazakh SSR. The plastic was produced in the course of a trial run of the first of four technological lines. Several types of plastics in a wide range of colors and hues will be produced here. During the first quarter of 1980, all construction and start-up adjustment work will be completed at the shop which will make impact-resistant polystyrene; and in the second quarter of the year, users will receive the first thousands of tons of the new product. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Jan 80 p 2]
[176-P]

POLYSTYRENE PRODUCTION BEGINS IN OMSK

Moscow IZVESTIYA in Russian 22 Mar 80 p 1

[Article by K. Mal'bakhov: "Siberian Polystyrene"]

[Excerpt] Omsk. A complex for the production of 100,000 tons of polystyrene annually is being built at the Omsk Plastics Plant. The first facility for the production of the new product has just become operational

The huge structures housing the shops and the stocks and raw materials center and the construction of the energy department and the stations for rendering by-products harmless by thermal means--all of these will be included in the intricate "Big Polystyrene" complex, which according to petrochemists' obligations must be completed in 1980.

The enterprise is being outfitted with the most modern equipment. The entire multikilometer utilities network, including electric cables and various piping, is laid on above-ground elevated structures. This is more convenient; and, with respect to the ground, safer. A recirculating water supply system and reservoirs for biological purification of run-off water were also installed here. The enterprise and the Synthetic Rubber Plant, which is its neighbor and principal supplier, are connected to a mutual purification facilities system. Acetaldehyde, the basic substance for the production of plastics, comes from its neighbor.

Acetaldehyde will now so to speak "meet" other substances in the new facilities, one of which has already produced the first batch of polystyrene. The plant has yet another specialty, i.e., the production of liquid gases: nitrogen and argon derived from the only raw material not requiring transportation--air. The mark of quality has recently appeared on cylinders with compressed nitrogen.

Because of outstanding performers, the plant expects to save this year 250,000 rubles just from the introduction of rationalizers' innovations and to conserve a million kilowatt-hours of electric power. The main shops have decided to complete the 4-month program by the 110th anniversary of V.I. Lenin's birth.
[173-P]

"TERMOPLAST" - A FUTURE AUTOMATED PLANT

Moscow PLASTICHESKIYE MASSY in Russian No 1, 1980 pp 5-6

NAGORNYY, S. M. and FURMANA, S.

[Abstract] The "Termoplast" plant in Minsk currently produces over 750 items used in tractors, radios, television sets, tape recorders, and other goods supplying over 2000 consumers. The main goal of the plant personnel is to fully mechanize and to automate the production process in the plant by the end of the Eleventh Five-Year Plan. Many steps have already been mechanized; for example, robot-manipulators for pressing-out plastic items have been installed, and an automated complex of 10 robot units has been established in the casting shop. The plant personnel collaborated with scientific organizations of the republic to develop an automated system for fluidized bed drying of plastics thereby cutting the drying time by a factor of six. In 1979 over 200 innovative suggestions were adopted to give an economic effect of 215,000 rubles. The 1979 plan was fulfilled on all indices, with production exceeding the plan by over 481,000 rubles. Although the plant is currently 79% automated, the ultimate goal is full automation.
[131-12027]

PROBLEMS IN ORE SHORTAGES REVIEWED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian No 6, 19 Mar 80 p 2

[Article by Ye. Leont'yeva: "Ore for the Harvest"]

[Text] Make hay while the sun shines. We're getting closer and closer to the crucial days of planting, the days of enormous concentration of efforts and uninterrupted operation of equipment. The chemists are getting ready as well -- without mineral food, the land will not yield rich harvests. That is why it is especially important right now for the conveyer between plant and field to work without interruption, and for the fertilizers to flow continuously.

The government is making enormous investments in the fertilizer industry, and because of this the output of mineral fertilizers is increasing with each passing year. But even at that, the sector as a whole is not keeping up with delivery schedules: the chemists have carried over a debt from last year to the grain growers for several million tons of fertility granules.

There are many reasons for this: incomplete use of capacities, late introduction of new enterprises, lack of coordination with associated industries. But the words "source of raw materials" are beginning to be glimpsed more and more frequently in these reasons. Shortage of raw material is becoming a serious impediment in development of the sector.

This difficulty did not spring up all of a sudden. It has been prepared by the entire practice of utilizing deposits of fertility stones. Preferance has been given to rich, easily processed ores, and the leaner ores have been left "until later." Moreover, only what lies close at hand has been taken, while less accessible sections of deposits have been left untouched.

The "whales" of fertility are phosphorus, potassium and sulfur (we leave out nitrogen, as the situation is simpler there). It is the rational use of these minerals that must be thoroughly discussed today. And it is not by chance that phosphorus is mentioned first; the problem of extracting phosphorus is especially acute. The rich phosphate ores like those on the Kola Peninsula are being used up. The discovery of the Karatau phosphorite deposit has been of great assistance.

The chemists, rejoicing in this generous gift, took the stone, crushed it and sent it straight to the furnace without any enrichment. But this simplicity in getting phosphorus has turned out to be temporary. As we might have expected, the time came to utilize lean ores that are difficult to enrich, and the chemists were not ready for this: there was neither any reliable technology for ore preparation, nor facilities in the necessary volume. For instance the balance of ore reserves on the Aktyubinsk deposit had been confirmed as far back as in the thirties, but to this day the production facilities have not been set up. The Vyatsk-Kamsk deposit was put into operation in 1915, but not more than one percent of the ore has been taken.

Clearly to go on taking only the top few centimeters will mean coming into conflict more and more with yesterday's economy, even if geologists could keep "throwing out" new reserves of high-quality ores. Today's tactic is unacceptable in the social aspect as well: a consumer attitude toward nature inevitably has its effect on the environment.

Geologists confirm that there are ore reserves in the eastern territories. Suffice it to mention only such deposits as Belkinsk, East Siberian and Seligdar in Yakutia.

But the way to these riches is not simple. The development of Siberian and Far Eastern apatites will take a long time. But for now, we have to go after phosphate raw material deep and wide, working what was heretofore rejected. And deep not only into the ore formation, but into the extracted lump of ore as well. Past mistakes have taught that we must make a more detailed study of the makeup of ores, and select the most rational methods of enriching them.

In connection with the fact that very little attention has been devoted to ore enrichment, and that technical equipment for processes has been neglected as well, the habit of using only rich ores has slowed down progress of research in this area. The experimental facilities planned in Karatau for studying possible enrichment were never constructed.

Technological arrangements have been found to be unreliable. Besides, the scarcity of reagents has crippled technology. As a rule, the reagents available have been products of complicated and variable composition such as wastes from processing of oils and fats of natural derivation. And it is here that organic products are needed with predetermined properties, which must be synthesized, and production needs to be organized for the requirements of mining chemistry. And this is difficult to achieve because of departmental red tape. We need the concerted efforts of chemists, and the workers in the cellulose and oil refining sectors. This work could have been coordinated by the State Committee of the USSR on Science and Technology. But so far, this committee has failed to do so.

Putting it briefly, the chain that includes extraction, enrichment and processing of fertility stones will become adequately reliable only when all its links are identically developed and strong. To be sure, this cannot be done without thorough technical and economic calculations from ore to finished fertilizer. The enrichment of lean ores will need new State standards and technical specifications. So far they have been accepted without sufficient substantiation, and slow things up.

The deficiencies typical of the extraction and utilization of apatites and phosphorites apply to a certain extent to sulfur-containing raw material as well, where we can also feel the shortage. Deposits of native sulfur are small, and therefore a primary task of developers is to have a cautious attitude toward this raw material. The means here are the same: increasing the part played by research, development of effective measures for working deposits, reducing losses, increasing the yield of the formation.

But, considering the limited reserves of sulfur, bearing in mind that it is no good to rush with the extraction of all riches accumulated by nature, let us talk about other ways to get this substance that is so important for the needs of chemistry. Apparently the time has come to turn attention to the production wastes of industrial sectors (the ministries of nonferrous and ferrous metallurgy, the coal industry and the petrochemical industry), where more than enough sulfur is used, and from which it can be extracted. And incidentally, there is much more accompanying sulfur than in the mineral raw material.

But unfortunately only a small part of the accompanying sulfur is used in the recovery and processing of petroleum, gas and coal. Ten percent from petroleum, and less than one percent from coal. And the sad thing is that it costs less to get it from petroleum than from sulfur ores. And it would be profitable from the ecological standpoint as well, since sulfur goes into the atmosphere along with other pollutants from metallurgical and gas enterprises.

An all-union conference specially convened a little more than a year ago in L'vov at VNIPIsera [expansion not given] inspired high hopes for a rapid resolution of the problem. Participating in this conference were representatives of all interested ministries and agencies. There was a lively discussion about the fact that processes of desulfurization have already been worked out by scientists, but for some reason have not been put to use, that work has practically stopped on utilization of sulfur oxides from flue gases of electric power plants, that annealing gases in the metallurgical industry are not desulfurized. There was also talk about the need for coordinating research on perfecting processes for obtaining accompanying sulfur and developing new technological schemes.

But the conference ended, the participants went their separate ways, and not a thing has been done. Reponsibilities have not been delegated, so far there has been no directive documentation, nobody knows who is to resolve the pertinent problems nor when it is to be done.

The problem of raw material sources for the potassium industry is less complicated than the preceding two. Its two main enterprises, "Uralkaliy" and "Beloruskaliy," would basically have been able to cope with their quotas, but they have been hampered by overloading of the railroad lines in these territories, and the shortage of freight cars is strongly felt. However, even here there are problems that are on the verge of becoming a greater hindrance than transport. The foremost of these is the quality of potassium fertilizers. So far there has been no problem with quantity.

Considerable investments are being made in setting up and introducing highly productive combine complexes, the processing of sunstone-sylvinite is constantly being improved, while the quality of the final product is so bad that it cancels out these efforts. Because potassium chloride is small-grained, there are considerable losses during transportation and application to the soil. These fertilizers are not only carried off by the wind, but are also spoiled by caking. That is why an acute need has arisen for increasing the volume of granulated fertilizers and the percentage of concentrated goods. This is something to think about for both the producers and the scientists at branch institutes, the Scientific Research Institute of Fertilizers and Insectofungicides imeni Ya. V. Samoylov, and the All-Union Scientific Research Institute of Halurgy.

Last year the Ministry of the Chemical Industry met 90% of the quota for mineral fertilizers. A lag is contemplated this year as well. That is why, considering all other work-slowing circumstances in the sector, the greatest attention must be given to the source of raw materials. Interaction between branch institutes engaged with raw materials must become more clear-cut and concrete. Right now, each tied to its own association, they are quite far apart, there is duplication of effort, and they unfortunately do not always attack the most urgent problems.
[119-6610]

6610
CSO: 1841

STRICT REQUIREMENTS ON KARATAU ORE AGGRAVATE PHOSPHORITE SHORTAGE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Jan 80 p 2

/Article by M. Mukhtarov, deputy chief process engineer of the Karatau Association, and Sh. Urgaliyev, chief of the Administration of the South Kazakhstan Okrug of the State Committee for Supervision of Industrial Safety and for Mining Inspection: "Unjustified Calculations"/

/Text/ Without phosphorites the production of mineral fertilizers is inconceivable. That is why chemicalization of agriculture now requires the most rapid rates of development and efficient utilization of their deposits. This task fully applies to the Karatau basin, unique in the reserves and quality of ores, whose depths contain about one-third of the reserves of phosphate raw materials prospected in the country.

A large complex of chemical industries was established at the Karatau base in South Kazakhstan and Central Asia. In our opinion, however, the rates of development and level of industrial utilization of ores by no means correspond to the basin's potentialities or national economic interests.

It is obvious that with the shortage of phosphorites we must put to use all the varieties of these raw materials, including ore, depleted of nutrients. The advanced electrothermal technique developed by the specialists of the sectorial Scientific Research Institute of Fertilizers, Insecticides and Fungicides imeni Ya. V. Samoylov offers such a possibility. It has already undergone industrial tests and has shown good results.

For example, the electrothermal method made it possible to obtain highly concentrated fertilizers from the Karatau phosphorites depleted of their useful substance. Phosphatized silicons from the Dzhanatas deposit, which previously were considered barren stripped rocks, were also drawn into industrial processing. Finally, the problem of industrial utilization of fines--waste accumulated in dumps for years--received a practical solution.

Progress has been made, but there is still a lot of work. For example, it is not possible to utilize all the incidentally obtained silicon-phosphate and phosphate-silicon ores, although in their content of useful components they are high-grade complex raw materials. The investigations of specialists confirm their suitability for fertilizer production.

However, more than 12 million tons of such ores have already been placed in dumps in the pits of the Dzhanatas mine and annually these dumps will increase by 2.5 to 3 million tons. At the same time, the processing of these ores by means of the electrothermal method will make it possible to raise the level of utilization of raw materials in the basin by 20 to 25 percent.

Instead of concentrating efforts in this direction, the planners of the head institute--Leningrad Scientific Research Institute for the Planning of Plants of the Basic Chemical Industry--chose a totally different, easier way--the way of placing stricter requirements on ore. To what will this lead? If chemists obtain only the best raw materials for processing and send them to the furnace without any preparation, miners will have to mine by the selective method. Then up to 20 percent of the ores that fully meet quality requirements will be dumped. Is this a solution of the problem of phosphorite shortage?

Incidentally, the delivery and processing of raw materials according to the new requirements, in practice, did not lead to a significant improvement in their processing indicators. However, the specialists of the institute continue to adhere to their position, although at one time the same Leningrad Scientific Research Institute for the Planning of Plants of the Basic Chemical Industry, fighting for the widest application of the electrothermal method, demonstrated the possibility for an effective processing of low-grade ores.

It would seem that the specialists of the Soyuzfosfor Association, who determine the technical policy in this area, should rise against such an unsound approach to the utilization of raw materials. Unfortunately, however, this has not happened.

According to our deepest conviction ensuring an acceptable minimum of phosphorus content is the only thing that can and should be demanded from the raw materials of Karatau for electrothermal processing. In practice, this minimum is ensured by the entire diversity of the basin's ores, including the millions of tons that today are dumped.

In brief, not natural resources should be adapted to techniques, but, conversely, techniques should be adjusted to them, otherwise we will only skim the cream. Placing stricter requirements on the chemical composition of raw materials without substantiation will undermine the raw material base of the phosphorus industry. If the requirements of the Leningrad Scientific Research Institute for the Planning of Plants of the Basic Chemical Industry are retained, losses at the basin's largest mine--Dzhanatas--alone will reach 40 percent of the deposit's total developed reserves.

The attempt to confine all the diversity of Karatau ores to the Procrustean bed of farfetched, technologically and economically unsubstantiated, requirements will lead to a general increase in the cost of production of phosphorus, fertilizers and technical and fodder phosphates throughout the country. Conversely, as experience shows, only on the basis of improvement in the technique of deep processing of natural unconcentrated phosphorites is it possible to obtain high-quality output from low-grade initial raw materials. In our opinion, only in this way is it possible to attain the most complete, rational and efficient utilization of the resources of the Karatau basin.
[88-11439]

11,439
CSO: 1841

UDC 661.522:658.562

PRODUCTION OF GRANULATED AMMONIUM SULFATE

Moscow KOKS I KHIMIYA in Russian No 11 1979 pp 29-31

FILIPPENKO, YE. S., GANZ, S. N., KUZYAYEV, I. M. (DKhTI) and SIDOGIN, V.P.
Dnepropetrovsk Coke Chemical Plant

[Abstract] The July 1978 Plenum of the CC CPSU projected improvement in production of mineral fertilizer, including the important nitrogen fertilizer. The coke-chemical industry has had the task of increasing production of ammonium sulfate (AS) and, in particular, improvement of its agrophysical properties which would better suit it in storage, transport and application. The latter properties are best met in a granulated form of AS. The DKhTI [Dnepropetrovsk Chemical Engineering Institute] and the authors' institute have worked out a way to stamp out AS briquettes using a closed press. Bilateral pressing in "floating matrices" over a broad range of specific pressures is applied; the briquettes were crushed in two-stage roll breakers and dispersed into classes >0.25 mm and after drying the AS to 0.3% moisture the salt was stamped. A drawing of the granulation device is presented. Specifications for stamping, using a hydraulic tabletting machine, model 270.3, are given. No existing technical processes have to be changed; the granulated AS meets GOST 9097-34 standards. Packaging for ultimate agricultural use is foreseen. Figures 2; references 5 (Russian).
[81-8586]

UDC 631.811.1:631.811.2

PRODUCTION OF GRANULATED NITROPHOS IN APPARATUS WITH A FLUIDIZED BED

Tashkant UZBEKSKIY KHIMICHESKIY ZHURNAL in Russian No 5 ubmitted 25 Oct 78 signed to press 30 Oct 79 pp 53-58

KASYMOVA, M. A., KAMALOV, K. M., KIM, B., PAVLOVA, A. I., and NORKULOV, A.,
Uzbek SSR Academy of Sciences Institute of Chemistry

[Abstract] Experiments were conducted at the Samarkand Superphosphate Plant to determine optimal conditions of processing an industrial solution produced by decomposition of Karatau phosphorites by a mixture of sulfuric acid and nitric acid with incomplete precipitation of calcium in the apparatus with a fluidized bed. A technological regime of operation was established. In includes: air temperature entering the apparatus, 117° - 118° C, the bed 80° - 90° C, speed of air at the grid level 1.3 - 1.4 m/se , total air expenditure of 4550 cubic meters at normal conditions/hour. With a loading of a solution of 300 kg, hr, the air

pressure at the nozzle is 3.1 - 3.2 kg/cm^2. A block diagram of the experimental device is presented. References: 5; Figures: 2.
[84-2791]

UDC 541.128

EFFECTS OF CHEMICAL COMPOSITION AND PREPARATION METHODS ON THE PROPERTIES OF COPRECIPITATED Fe_2O_3-CoO-MgO CATALYST IN AMMONIA SYNTHESIS

Minsk IZVESTIYA AKADEMII NAUK BSSR--SERIYA KHIMICHESKIKH NAUK in Russian No 6, 1979 pp 26-28

[Abstract] Efficiency of Fe_2O_3-CoO-MgO as a catalyst in ammonia synthesis was evaluated in terms of its chemical composition catalytic activity shown by $2Fe_2O_3$-0.5CoO-0.5Mg, using 0.75-1.0% K_2O promoter, in a system of stoichiometric nitrogen-water mixture under 300 atm pressure at 400-500° C. This catalytic system is particularly effective in ammonia synthesis at low temperatures. Tables 1; Figures 1; References: 5 Russian.
[94-12172]

UDC [661.635.213+661.635.223].002.612.3
[661.635.213+661.525.3].002.612.3

PREPARATION OF AMMOPHOS AND NITROAMMOPHOSK FROM TOOLSE PHOSPHORITES

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 12, Dec 79 pp 722-724

AASAMYAE, E. E., VEYDERMA, M. A. and REBANE, A. I.

[Abstract] Extraction grade phosphoric acid, produced from five different samples of Toolse phosphorite in dihydrate form, was experimentally treated by ammonization to ammophos and also to nitroammophosk. In both cases the impurity oxides together act as a ballast deducing the concentration of assimilable P_2O_5 without causing retrogradation, while Fe_2O_3 alone causes retrogradation of water-soluble P_2O_5 reducing its concentration linearly with increasing Fe_2O_3:P_2O_5 ratio. Toolse phosphorite is suitable for preparation of standard "A" grade ammophos as long as the ratio of nonpyritic Fe_2O_3 to P_2O_5 does not exceed 4%. Standard "A" grade nitroammophosk may also be derived from Toolse phosphorite as long as it is not more than 15% neutralized and the ratio of Fe_2O_3:P_2O_5 does not exceed 5%. Figures 1; tables 2; references 6 (Russian).
[92-2415]

UDC 661.635.4

PRODUCTION OF FODDER DICALCIUMPHOSPHATE FROM NITROPHOSPHATE SOLUTIONS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 52, No 7, Jul 79
pp 1456-1458

B. A. Dmitriyevskiy, V. Ye. Sukmanov and B. A. Kopylev

[Abstract] Currently fodder dicalciumphosphate is obtained principally from the expensive thermal phosphoric acid. The use of the cheaper extraction phosphoric acid is complicated by technical problems. In connection with the increased production of phosphate fertilizers, it was of interest to investigate the possibility of producing fodder dicalciumphosphate by means of the purification of phosphoric acid and nitrogen phosphate solutions during the ammonization process. Results of the purification of nitrogen phosphate solution of apathite were reported. To determine conditions under which all impurities would be precipitated, the process was analyzed by means of a phase equilibrium diagram $NH_4H_2PO_4$-NH_4NO_3-H_2O. It was established that during the ammonization of a mixed nitrophosphate solution consisting of ammonium nitrate, phosphoric acid and admixtures of the phosphate crude material, the oxides of iron and aluminum, together with fluorine compounds are the first to precipitate out in the pH range 2-2.5. The dicalciumphosphate obtained is anhydrous, satisfying the standard requirements. Figures 3, references 7: 4 Russian, 3 Polish.
[38-7813]

UDC 661.632.17

STUDIES OF THE CIRCULATION METHOD FOR THE PRODUCTION OF DOUBLE SUPERPHOSPHATE

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 52, No 7, Jul 79
pp 1445-1450

R. Yu. Zinyuk, T. I. Fomicheva, M. A. Shapkin, et al.

[Abstract] The circulation method for the production of double superphosphate makes it possible to convert the phosphate from crude starting materials to a form which can be utilized by the plants. All of the known production methods are rather expensive. Exploratory work was performed on the decomposition of the Kingisep phosphorite at 110-130°, using excess phosphoric acid. Optimal technological conditions for production of double superphosphate with rather complete utilization of the crude phosphate consisted of the use of a six-fold excess of sulfuric acid (55-60% P_2O_5) and a temperature of 130° C. This assures

formation of a high quality double superphosphate with 50-52 percent of assimilable P_2O_5, starting from a relatively poor (28-29 percent P_2O_5), magnesium containing crude. Double superphosphate neutralized with ammonia contains a small amount of monoammonium phosphate along with monocalcium-phosphate. The product is not hydroscopic and does not cake even on storage in open air. Figures 3, references 11: all Russian.
[38-7813]

UDC 546.171.1'185:542.936

THE EFFECT OF AMMONIUM NITRATE ON THE DEHYDRATION KINETICS OF MONOSUBSTITUTED AMMONIUM ORTHOPHOSPHATE

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 52, No 7, Jul 79
pp 1441-1445

A. V. Kononov, N. V. Trutneva, L. I. Yevdokimova, et al.

[Abstract] The results of a study on the dehydration kinetics of pure $NH_4H_2PO_4$ (I) and $NH_4H_2PO_4$ mixed with NH_4NO_3 (II) are presented. The ratio of I to NH_4NO_3 (III) was 42:58, corresponding to the $N:P_2O_5$ ratio of 1:1 - the most common ratio of fertilizers. The studies were run in the temperature range 170-190°, where I remained solid, while II mixture was practically a homogeneous melt. The samples were heated in a thin walled vessel, and, at given time periods, the content of P_2O_5 and P_2O_5 in orthoform was determined. The dehydration of I in the presence of III was faster only in the initial period, which was inversely related to the temperature rise. After this period the pure I dehydrates faster, and to a greater extent. These differences could be due to the formation of water in the melt. Thus it was shown that III affects dehydration of I primarily by lowering the melting point of the mixture of II. Initially, the liquid phase favors the dehydration process. In later stages, the presence of water in the melt, coupled with its low diffusion rate towards the surface, resulted in a slower rate of dehydration. Figures 3, references 7: 4 Russian, 3 Western.
[38-7813]

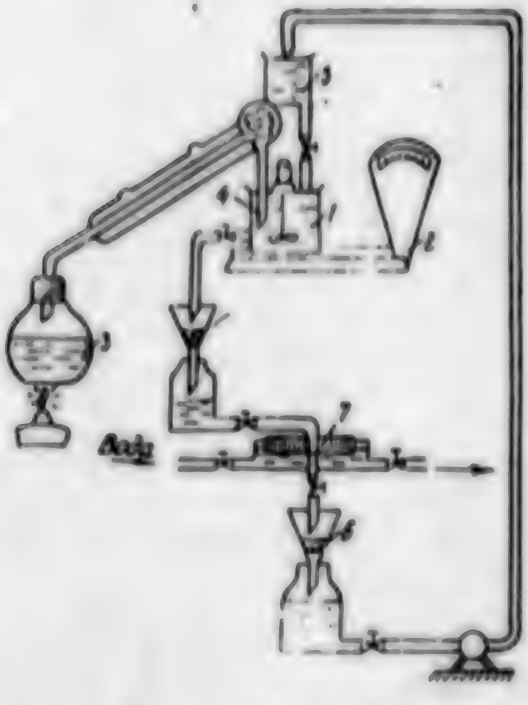
UDC 661.522/661.25.002.8/66.094.8

PREPARATION OF AMMONIUM SULFATE FROM SPENT SULFURIC ACID

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 12, 1979 pp 32-34
manuscript received 4 Jan 79

BURBA, A. A., MALKIN, V. P., FEDIN, A. V., VAKAR', G. P., ALEMBAYEV, G. I., and SHMIDT, L. P., Orenburg Polytechnic Institute

[Abstract] The inadequacies of the current process for the title synthesis are overcome using a new system. The laboratory model has the following configuration:



where 1 is the neutralizer; 2, a technical scale; 3, receiving container for the gaseous ammonia; 4, the gas transfer tube; 5, measuring funnel; 6, funnel for the heated filtration; and 7, the crystallizer. The spent sulfuric acid is placed in the neutralizer and weighed. Gaseous ammonia from the receiving container is introduced into the neutralizer through the transfer tube and bubbled through the sulfuric acid. This generates a suspension of resinous organic material in a supersaturated solution of ammonium sulfate. The organic material is filtered off, the filtrate cooled in the crystallizer and the crystals collected by a second filter. Analyses show that 167 g of original spent sulfuric acid contained 155 g of H_2SO_4, 42.2 g H_2O, and 10.1 g organic material. After purification,

the products weighed 163.3 g (98.9% recovery) composed of 155 g of $(NH_4)_2SO_4$ and 8.3 g of organic material. The crystals themselves contained only 0.4% organic matter and 0.025% free sulfuric acid. Figures 2.
[140-12027]

UDC 661.53:66.048.2

INFLUENCE OF SECONDARY CONDENSATION TEMPERATURE ON THE PRODUCTIVITY OF A LARGE CAPACITY AMMONIA SYNTHESIS PLANT

Kiev KHIMICHESKAYA TAKHNOLOGIYA in Russian No 1, Jan/Feb 80 pp 3-6
manuscript received 5 Apr 78

YEFIMOV, V. T., ATROSHCHENKO, V. I., BABICHENKO, A. K., YEROSHCHENKOV, S. A., BUKAROV, A. R.

[Abstract] The notion that the temperature to which the circulating gas is cooled in an ammonia condensation unit has little influence on the operation of the synthesis section of the plant is erroneous. Although this temperature has less influence on output than such factors as pressure, synthesis temperature, space velocity and quantity of inert gases, its influence is still great enough that it should be considered. Experimental studies were performed on an industrial synthesis unit with a planned output of 1360 t of ammonia per day by recording the technological parameters and productivity. Equations are derived which describe the operation of the plant. A numerical example is appended. Figures 3, References 9 Russian.
[137-6508]

UDC 633.11:631.81

ECONOMIC EFFECTIVENESS OF MINERAL FERTILIZERS ON PLANTING OF VARIOUS STRAINS OF WINTER WHEAT IN THE LEFT BANK FORESTED STEPPE REGION OF THE UKRAIKIAN SSR

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1980 pp 43-44

SHAPOVAL, I. S., PREDKO, I. G., Candidates of Agricultural Sciences, Drabovskaya Experimental Station

[Abstract] The author studied the economic effectiveness of various doses and methods of application of mineral fertilizers for growth of two strains of winter wheat in 1975, 1977 and 1978. The results of the studies showed that the economic effectiveness of fertilizers depends

to a great extent on the strain of wheat. For the strains tested, full mineral fertilization in the fall during plowing with a dose of $N_{30}P_{60}K_{60}$ is economically most suitable. References: 3 Russian.
[136-6508]

UDC 631.893.12

SUPERPHOSPHORIC ACID - BASIC STARTING MATERIAL IN THE PRODUCTION OF LIQUID FERTILIZERS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, 1980 pp 82-84

V. M. LEMBRIKOV, N. N. MALAKHOVA, V. M. BORISOV, et al.

[Abstract] With the introduction of liquid fertilizers, laboratory and industrial studies were carried out on the production of a 10-34-0 type fertilizer from superphosphoric acid, which was obtained from crude Florida (USA) phosphorite. The imported acid was processed by the same method used for domestic material. Complex liquid fertilizers produced are black liquids containing slowly sedimenting material; they were used to produce a number of commercial fertilizers with excellent physical-chemical properties and adequate storage stability. Figures: 4, one Russian reference.
[129-7813]

UDC [661.7:547.298.12](047)

SYNTHESIS AND UTILIZATION OF DIMETHYLACETAMIDE

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, 1980 pp 69-71

M. I. YAKUSHKIN, V. I. KOTOV and T. P. SMAYEVA

[Abstract] Dimethylacetamide (DMAA) is an effective aprotonic solvent with an increasing range of applications in various industries. It shows higher thermal and hydrolytic stability than dimethylformamide, and is at the same time less corrosive, less toxic and less expensive. It is a colorless, volatile liquid, b. p. 165.5° C, m. p. -20.0°C. It is miscible with water, ethers and esters, ketones and aromatic hydrocarbons. Principal areas of application and a number of synthetic methods have been reviewed, covering literature from 1954 to 1977. One of the most efficient synthetic methods is the continuous process of vapor phase condensation of acetic acid and dimethylamine carried out at atmospheric pressure and 260-280° C over a dehydrating catalyst. The yield is almost quantitative. References 49: 10 Russian, 39 Western.
[129-7813]

UDC [661.7:547.292'361.2].002.237

PRODUCTION OF VINYL ACETATE WITH THE ADDITION OF ACTIVE SALT DURING THE PROCESS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, 1980 pp 73-74

M. A. GLIKIN, L. M. SAVITSKAYA, I. I. YEVSEYEVA, et al.

[Abstract] Domestically, vinyl acetate is produced from acetylene over a stationary catalyst - zinc acetate deposited on activated charcoal. One of the factors determining the duration of catalyst activity is the level of zinc acetate in it. An attempt was made to improve the performance of the catalyst by adding zinc acetate with acetic acid directly into the catalyst zone, without interrupting the synthetic process. This was shown to be possible. Addition of zinc acetate during the active process directly into the catalyst increased the catalyst activity and slowed down the aging process. This led to at least a 5 percent reduction of production costs. Figures 2, references 3: all Russian.
[129-7813]

UDC 661.7:547.496.1

THE PRODUCTION OF O-ISOPROPYL-N-METHYLTHIOCARBAMATE

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, 1980 pp 75-76

G. A. FESTOVA, V. A. MALIY, P. P. GNATYUK, et al.

[Abstract] O,N-Dialkylthiocarbamates are used in the flotation enrichment of copper-zinc and copper-molybdenum ores. In the past, these reagents were imported into the USSR. An attempt was made to develop a production method for o-isopropyl-Nmethylthiocarbamate (ITC) from easily available starting materials: potassium isopropylxanthogenate and an aqueous solution of methylamine. Optimal reaction conditions developed for this process are: a temperature of 75-85° C; a molar ratio of xanthogenate:methylamine: methylammonium polysulfide of 1:2:0.25; and a reaction time of 3 hrs. The yield of ITC was in excess of 80 percent, based on the starting carbamate. Figure 1, references 9: 4 Russian, 5 Western.
[129-7813]

UDC 634.0.863.5.002:665.44

COMPOSITION OF THE LIPIDS IN YEASTS GROWN ON NEUTRALIZED PEAT OXIDATE

GIDROLIZNAYA I LESOKHIMICHESKAYA PROMYSHLENNOST' in Russian No 8, 1979 pp 3-4

ANDREYEVSKAYA, V. D., Candidate of Biologic Sciences and ZALASHKO, M. V., Doctor of Biologic Sciences, Institute of Microbiology, BSSR Academy of Sciences

[Abstract] Studies were made on the growth of yeasts capable of increased accumulation of intracellular lipids on peat oxidate neutralized with various acids. The peat oxidate was first diluted with water to 1% organic matter content and neutralized to pH 5.8 with concentrated sulphuric, phosphoric or nitric acid. Ammonium phosphates, magnesium and potassium sulphates and calcium chloride were added, then the medium was sterilized and the studies performed with candida tropicalis and lipomuces lipopherus. It was found that the particular acid used had no effect on cultivation or the composition of lipids synthesized. References: 4 Russian. [118-6508]

UDC 634.0.813.14:678.019.31:621.926.55

CONTINUOUS MECHANOCHEMICAL DESTRUCTION OF CELLOLIGIN POLYSACCHARIDES ON AN EXPERIMENTAL M-100 VIBRATING MILL

GIDROLIZNAYA I LESOKHIMICHESKAYA PROMYSHLENNOST' in Russian No 8, 1979 pp 1-3

USKOV, YU. N., CHALOV, N. V., Candidates of Technical Sciences, "Gidrolizprom" Scientific-Technical Society

[Abstract] The Special Design Bureau of the All-Union Scientific Research Institute of New Construction Materials has developed an experimental vibrating mill, the M-100, for mechanochemical destruction of the polysaccharides in plant materials. Stable operation of the vibrating mill and smooth regulation of the quantity of material continuously passing through the milling chambers is achieved by the use of transfer devices which operate by changing the height of a slide valve through which the material must flow. The use of two chambers and the transfer device, which assures that the material moves through the machine at a constant speed, assures that the material spends the same amount of time in the machine, thus assuring uniform quality of the product. The machine operates at 150-200 kg/(hr·m^3). Its specific power consumption is 0.72-0.95 kW·hr per kg of feed material. Figure 1, References: 3 Russian. [118-6508]

UTILIZATION OF GASEOUS GASOLINE AS A MOTOR FUEL

Moscow KHIMIYA I TAKHNOLOGIYA TOPLIV I MASEL in Russian No 12, 1979
pp 23-24

YEMEL'YANOV, V. YE., LEVINSON, G. I., ENGLIN, B. A., GOLOSOVA, V. F.,
All-Union Scientific Research Institute of the Petroleum Industry

[Abstract] The use of gaseous gasoline as a motor fuel has great economic potential, particularly for western Siberia. It will allow an increase in local motor fuel resources and a significant reduction in the cost of transportation. Studies of these fields were performed as called for in State Standard GOST 2084-77. Addition of 5 to 7% butane, while retaining the pentane content at 25%, allows the fuels to be used in the winter in Siberia. The use of gasoline from gas-processing plants and light gas condensates as winter and Arctic gasoline meets the requirements of western Siberia and the far north for motor vehicle fuels, while reducing losses in transportation and storage.
[82-6508]

UDC 662.741.3.022:622.794

ENRICHMENT AND DEHYDRATION OF COAL TAILINGS WITH ORGANIC ADDITIVES ON AN INDUSTRIAL-EXPERIMENTAL INSTALLATION

Moscow KOKS I KHIMIYA in Russian No 9, 1979 pp 7-9

V. P. Kurbatov, B. I. Cheremonov, P. M. Zhitnikov, et al., Gubakhin Coke-Chemical Plant

[Abstract] Based on laboratory and pilot plant studies, an experimental industrial installation was constructed at the plant for enrichment and dehydration of coal tailings treated with organic additives, viz. furnace heating oil 100. Eventually many operations will be automated. Currently, preliminary results have been achieved under manual operations, indicating the technical potential of this new equipment to be quite adequate. Even these early results show improved coke properties, a more homogeneous product, and the absence of furnace drilling. Figure 1, no references.
[42-7813]

ORGANOMETALLIC COMPOUNDS

UDC 547.254:547.341

REACTION OF MAGNESIUMORGANIC COMPOUNDS WITH SELENOPHOSPHORIC ACID CHLORIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2386-2387 manuscript received 9 Feb 79

N. A. BUINA, F. G. SIDHATULLINA and I. A. NURETDINOV, Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the USSR Academy of Sciences

[Abstract] Diethylchloroselenophosphinate reacts with C_2H_5MgBr and C_6H_5MgBr in diethyl ether forming triethylphosphine selenide, m.p. 111° C and diethylphenylphosphineselenide (I) d_4^{20} 1.2584, n_D^{20} 1.6013. I reacts with C H MgBr to yield triphenylphosphineselenide, m.p. 186-188° C. References 2: both Russian.
[125-7813]

UDC 547.242

SYNTHESIS OF AMIDOESTERS OF ARSINOUS ACIDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2396-2397 manuscript received 26 Apr 79

L. B. IONOV, A. P. KOROVYAKOV and B. D. CHERNOKAL'SKIY (deceased), Udmurt State University imeni The 50th Anniversary of the USSR, Kazan' Chemical-Technological Institute imeni S. M. Kirov

[Abstract] Phenyldiethylaminochloroarsine reacts with alkali metal alkoxides at room temperature to form amidoesters of arsinous acid. Another synthetic route includes the reaction of bis(diethylamino)phenylarsine with high boiling alcohols. The products are colorless liquids, soluble in most organic solvents. They are very sensitive to moisture and oxygen. One Russian reference.
[125-7813]

UDC 547.241:541.9

INTERACTION OF ACETYLDIPHENYLPHOSPHENITE WITH TIN TETRAHALIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian, No 2, Feb 80 pp 275-280
manuscript received 16 Jan 79

MURATOVA, A. A., SOBANOVA, O. B., YARKOVA, E. G., KHRAMOV, A. S.,
PUDOVIK, A. N., Kazan'State University imeni V. I. Ul'yanov-Lenin

[Abstract] A study is made of the interaction of acetyldiphenylphosphenite with tetrahalides of tin, and the behavior of acetylphosphites and acetylphosphenites in these reactions is compared. The reaction was performed in an atmosphere of dry argon. Experimental analysis data, nuclear and infrared spectroscopic data are presented. In methylene chloride, disproportionation occurs with the formation of acetic anhydride and complexes of tin tetrahalide and diphenylphosphenic acid anhydride and tetraphenylphosphine. In pentane, isomerization also occurs. References 7: 4 Russian, 3 Western.
[128-6508]

UDC 547.241:541.9

REACTION OF INTRODUCTION OF COMPLEXLY BOUND DIHALIDES OF TIN AT THE P-O-P GROUP OF DIETHYLPHOSPHORIC AND DIPHENYLPHOSPHENIC ACID ANHYDRIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 280-285
manuscript received 2 Feb 79

MURAMOVA, A. A., SOBANOVA, O. B., YARKOVA, E. G., KHRAMOV, A. S.,
PUDOVIK, A. N., Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] A study is made of the reaction of dihalides of tin with organophosphorus compounds having P-O-P or P-P bonds. It is found that the interaction of phosphenic and phosphoric acid anhydrides with stannous dihalides leads to the formation of complex compounds rather than products of introduction. When oxygen is present to stabilize the tetravalent state of tin, the dihalide can be introduced at the P-O bond to form dihalides of the corresponding phosphorous acids. References 14: 9 Russian, 5 Western.
[128-6508]

UDC 547.26'118

MECHANISM OF INTERACTION OF DIMETHYLPHOSPHOROUS MONOISOCYANATE WITH BENZOYLPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 285-290
manuscript received 5 Feb 79

KONOVALOVA, I. V., GAREYEV, R. D., BURNAYEVA, L. A., MIKHAYLOVA, N. V., PUDOVIK, A. N., Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] A study is made of the reaction of dimethylphosphorous monoisocyanate with dimethyl and diisopropyl benzoylphosphonate and para-substituted benzoylphosphonates. The reaction was conducted with a ratio of the initial reagents of 1 to 1 in methylene chloride at temperatures below 0 C. The reaction produced thick greenish liquids, soluble in most organic solvents. High resolution PMR spectroscopy is used to confirm the identity of the compounds produced. A mechanism is suggested for the reaction, agreeing with the NMR data. Dimethylisocynatophosphite reacts with the esters to form 4-methyl-3-methoxy-3-oxo-2-substituted 2-dialkylphosphone-3-phosphaoxazolidine-5-ones, as mixtures of the two geometric isomers. Diethylisocyanatophosphite reacts with dialkylbenzoylphosphonates to form 3-ethyl-2-ethoxy-2-oxo-5-phenyl-5-dialkylphosphone-2-phosphaoxazolidine-4-ones and 2, 4-diethoxy-5-phenyl-5-dialkylphosphone-2-phosphaoxazo-3-oles. References: 5 Russian.
[128-6508]

UDC 546.183+547.444.5+547.79+543.422+541.624

SYNTHESIS AND STRUCTURE OF 1, 3, 2-OXAZA-4-PHOSPHOLINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian, No 2, Feb 80 pp 291-304
manuscript received 10 Jan 79

GALITSKIY, YU. V., GOLOLOBOV, YU. G., YURCHENKO, V. M., ANTIPIN, M. YU., STRUCHKOV, YU. T., BOLDESKUL, I. YE., Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] In order to synthesize new representatives of the 1, 3, 2-oxaza-4-phospholines, study their structure and chemical properties, the authors use the reaction of PCl_3 in the presence of triethylamine or pyradine, introducing various α-(N-alkyl)-aminopinacolines in ether or chlorohydrates in chloroform. The PCl_3 reaction forms 2-chloro-3, 5-dialkyl-1, 3, 2-oxaza-4-phospholines. Oxidative fluorination of 2-methyl-3, 5-di-tert-butyl-1, 3, 2-oxaza-4-phospholine with $SbCl_3$ produces the corresponding difluorophosphorane. Full x-ray structural analysis is used to determine the structure of 2-oxo-2-methyl-3, 5-di-tert-butyl-1,

3, 2-oxaza-4-phospholine, which has an "envelope" shape with the phosphorus atom outside the plane of the remaining 4 atoms of the cycle. Figures 2, References 28: 13 Russian, 15 Western.
[128-6508]

UDC 547.241

ESTERS OF N-(β -OXYETHYL)-N-BENZYLAMINOMETHYLPHOSPHONIC ACID

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 204-209
manuscript received 28 Dec 78

NIFANT'EV, E. YE., RUNOVA, L. M., SHESTAKOVA, T. L., BOGATYREVA, YE. V., RONKOV, V. I., Orekhovo-Zuyevskiy Pedagogic Institute, Moscow Pedagogic Institute, imeni V. I. Lenin

[Abstract] Detailed studies are performed on the interaction of N-benzyloxazoladines with dialkylphosphites. It is shown that heating of the reagent to 40-60° C without a solvent produces diesters of N-(β -oxyethyl)-N-benzylaminomethylphosphonic acid with a yield of 96-98%. The same substances are formed when benzyloxyethylamine interacts with formaldehyde and dialkylphosphites during azeotropic distillation of water. The former method is preferrable for preparation purposes. During vacuum distillation, the dimethyl ester undergoes intramolecular alkylation at the nitrogen atom forming an internal salt. The compounds produced are effective steel corrosion inhibitors for acid conditions. Figures 4, References 8: 4 Russian, 4 Western.
[128-6508]

UDC 661.718.1

COMPLEXES OF PHENOL WITH TRIVALENT PHOSPHOROUS ACID AMIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 309-311
manuscript received 14 Mar 79

SHIBAYEV, V. I., GARABADZHIU, A. V., LAVRENT'EV, A. N., SOCHILIN, YE. G., Leningrad Institute of Technology imeni Lensovet

[Abstract] IR spectroscopy was used to study the formation of the hydrogen bonds of phenol with several compounds of trivalent phosphorus. The coordination of phenol and H complexes with acid alkyl amides of trivalent phosphorus occurs at the nitrogen atom. In aminophosphines with phenol groups at the phosphorus atom, coordination of phenol occurs both at the nitrogen atom and at the phosphorus atom. References: 6 Russian.
[128-6508]

UDC 546.185

REACTION OF 1-TRICHLOROPHOSPHAZO-1, 1-DICHLOROALKANES WITH CHLORINATED NITRILES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian, No 2, Feb 80 pp 311-318
manuscript received 3 Apr 79

BOYKO, A. P., KUKHAR', V. P., KISILENKO, A. A., Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] It has been found in recent years that nitriles with an activated $C\equiv N$ bond attach chlorine, chlorides of phosphorus, acylchlorides, benzotrichlorides and benzalchlorides in the presence of electrophylic catalysts and Lewis acids. The authors found that 1-trichlorophosphazo-1, 1-dichloroalkanes also attach at the $C\equiv N$ bond to trichloroacetonitrile, dichloroacetonitrile and dichloromalononitrile. The trichlorophosphazo group does not participate in this reaction. Attachment occurs only due to the α-dichloromethylene group of the molecule, forming N-substituted 1-trichlorophosphaza-1-iminoalkanes. References 12: 9 Russian, 3 Western.
[128-6508]

UDC 547.241+547.421.2

P^{III}-PHOSPHORYLATED ACETALS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 318-320
manuscript received 24 Jan 79

ZHMUROVA, I. N., YURCHENKO, V. G., Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] Until recently P^{III}-phosphorylated acetals of aliphatic aldehydes were not known. The authors produced them by one of the known methods of synthesis of asymmetrical tertiary phosphines -- alkylation of diphenylaliphosphines with subsequent cyanolysis of the phosphonium salts formed. References 5: 1 Russian, 4 Western.
[128-6508]

UDC 541.64:547.241

IR SPECTRA AND PECULARITIES OF THE EFFECTS OF CONJUGATION IN COMPLEXES OF PHENOL WITH PHOSPHINE OXIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 321-326
manuscript received 3 Apr 79

GONCHAROVA, L. V., SHVETS, A. A., SUKHORUKOV, YU. I., OSIPOV, O. A., TALANOVA, L. N., Rostov-Na-Donu State University

[Abstract] A study is made of results produced in reactions of formation of complexes of phenol with dimethylaryl phosphine and triaryl phosphine oxides. The phosphine oxides were produced by reaction of the corresponding aryl magnesium bromide on dimethylphosphinic acid chloride. The range of oxides of triaryl phosphines studied was thus expanded over previous works. Correlation of the frequency of hydroxyl absorption in complexes with phenol is studied. There is some increase in the significance of conjugation effects in comparison to the induction effects upon transition from complexes of monoaryl phosphine oxides to triaryl phosphine oxides. References 15: 11 Russian, 4 Western.
[128-6508]

UDC 547.27[37:542.91

SOME TRANSFORMATIONS OF 0, 0-DIALKYL-1-OXYALKENYL AND 0, 0-DIALKYL-1-OXYALKENYLPHENYLPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 326-329
manuscript received 27 Mar 79

SHOSTAKOVSKIY, M. F., GAFUROV, YE. K., DOSMUKHOTBETOVA, K. K., SAL'KEYEVA, L., Karaganda State University

[Abstract] Halogenation of the two compounds mentioned in the title was performed with free chlorine and bromine in order to determine the reactivity of the unsaturated bonds. No anomalous course of the reaction of attachment was observed. However, when 0, 0-dialkyl-1-oxy-2-butenyl phosphonates are halogenated, the hydrogen atom in the methyl radical is replaced by the halogen. References: 5 Russian.
[128-6508]

UDC 547.241

PHOSPHORYLATED AMINOTHIAZOLS, AMINOTHIAZOLINES AND AMINOIMIDAZOLINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 329-336
manuscript received 10 Jul 78

RAZVODOVSKAYA, L. V., GRAPOV, A. F., ORLOV, S. I., KHASAN'YANOVA, E. SH., MEL'NIKOV, N. N., All-Union Scientific Research Institute of Chemical Means of Plant Protection

[Abstract] Continuing works on phosphorylation of amidine systems, the reactions of phosphorylation and thiophosphorylation of 2-aminothiazol, 2-aminothiazoline and 2-aminoimidazoline by various phosphorylating agents were studied. Phosphorylation and thiophosphorylation of 2-aminothiozoline and phosphorylation of 2-aminothiazol and 2-aminoimidazoline occur at the exocyclic nitrogen atom, while thiophosphorylation of 2-aminothiazol and 2-aminoimidazoline occurs both at the exocyclic nitrogen atom and at the 2 nitrogen atoms (exocyclic and endocyclic) simultaneously. References 7: 6 Russian, 1 Western.
[128-6508]

UDC 547.718

INTERACTION OF SPATIALLY SHIELDED DIALKYLAMINODICHLOROPHOSPHINES WITH TERT-BUTYLAMINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 337-342
manuscript received 2 Feb 79

MARKOVSKIY, L. N., ROMANENKO, V. D., RUBAN, A. V., ROBENKO, L. A., Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] A study is made of the interaction of dialkylaminodichlorophosphines containing various substituents at the phosphorus atom with tert-butylamine. Products are formed which correspond to two directions of the reaction. One in which the dialkylamino group is retained at the phosphorus atom, and one in which substitution occurs. A trend is noted toward increasing yield of 1, 3-bis-tert-butyl-2, 4-bis-tert-butylaminodiazadiphosphetidine with increasing volume of the dialkylamino group in the initial dialkylaminodichlorophosphine. The interaction of spatially shielded dialkylaminodichlorophosphines with tert-butylamine leads exclusively to 1, 3-bis-tert-butyl-2, 4-bis-tert-butylaminodiazadiphosphetidine. References 14: 4 Russian, 10 Western.
[128-6508]

UDC 547.341+547.491.4

1-DIHALOGENPHOSPHONYLVINYLISOCYANATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 343-347
manuscript received 6 Mar 79

STUKALO, YE. A., YUR'EVA, YE. M., MARKOVSKIY, L. N., Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] The authors synthesized 1-dichloro- and 1-difluorophosphonylvinylisocyanates from 1, 2-dihalogenoethylisocyanates in order to study the mutual influence of the position of the phosphoryl and isocyanate groups in the molecule of phosphorylated vinylisocyanates on their reactivity and the physiologic activity of the derivatives of the compounds. Chlorination of 1-dichlorophosphonylvinylisocyanate with antimony trifluoride leads to the formation of 1-difluorophosphonylvinylisocyanate. When 1-dihalogenphosphonylvinylisocyanates are interacted with an excess of alcohol and amines, phosphorylated urethanes and urea are formed.
References: 5 Russian.
[128-6508]

UDC 547.1'118+547.26'118

A NEW METHOD FOR PRODUCTION OF 2-AMINOETHYLPHOSPHONIC ACIDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 456-457
manuscript received 13 Aug 79

GUBNITSKAYA, YE. S., SEMASHKO, Z. T., Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] A new and convenient preparative method has been discovered for the synthesis of ethyl esters of 2-aminoethylphosphonic acids -- hydrolysis of 1-alkyl-2-epoxy-2-oxo-1, 2-azaphosphetadines. IR and NMR spectra were used to verify the composition of the products.
References: 4 Russian.
[128-6508]

UDC 547.241

2, 6-DIPHENYL-4-OXO-4-OXY-1, 4-AZAPHOSPHORINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 457-458
manuscript received 15 Aug 79

FEDOROVA, G. K., MOSKALEVSKAYA, L. S.

[Abstract] The authors found that heating of diphenacylphosphinic acid with ammonium acetate forms 2, 6-diphenyl-4-oxo-4-oxy-1, 4-azaphosphorine -- a new type of cyclic aminophosphinic acid. It is a colorless crystalline substance. The composition and structure are confirmed by elemental analysis, IR and PMR spectra. It has amphoteric properties like all amino acids, is titrated with alkali and yields a salt with butylamine and hydrogen chloride. References 4: 3 Russian, 1 Western.
[128-6508]

UDC 547.26'118

SYNTHESIS AND PROPERTIES OF PHOSPHORUS-CONTAINING α-CHLOROESTERS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 458-459
manuscript received 18 Jun 79

BOGDANOVA, O. S., BREL', A. K., RAKHIMOV, A. I.

[Abstract] The authors discovered that β-oxyethyldimethylphosphonate enters the Henri-Litterscheid reaction, forming the corresponding α-chloroesters with a yield of 86-90%. The reaction is performed by passing dry hydrogen chloride through a mixture of 0.1 mole phosphonate and 0.125 mole of the corresponding aldehyde in a medium of chloroform for 40-50 minutes in the presence of a drying agent at 0-8° C. The residue after evaporating the unreacted HCl and distillation of the solvent is subjected to vacuum distillation. The structure and individuality of the products are confirmed by IR and PMR spectra, elemental analysis, determination of molecular refraction and molecular weights. References 2: 1 Russian, 1 Western.
[128-6508]

UDC 547.26'118

SYNTHESIS OF 4-OXO-1, 3, 2-DIAZAPHOSPHORINANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 459-460
manuscript received 25 Jul 79

NIFANT'EV, E. YE., ZAVALISHINA, A. I., SMIRNOVA, YE. I., VLASOVA, M. M.

[Abstract] Synthesis of a new type of 1, 3, 2-diazaphosphorinane containing a carbonyl group in position 4 of the cycle is achieved. The best results are obtained by phosphorylation with phosphorous acid hexaethyltriamide. The structure of the products produced is confirmed by elemental analysis, TLC and IR and NMR spectroscopy. Attachment of sulfur to the compounds produces the corresponding thionophosphates.
[128-6508]

UDC 547.341

STRUCTURE OF PRODUCTS OF PHOSPHORYLATION OF ALKENES WITH PHOSPHORUS PENTACHLORIDE IN SOLUTIONS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 461-462
manuscript received 23 Jul 79

ROZINOV, V. G., RYBKINA, V. V., GLUKHIKH, V. I., KALABINA, A. V., LAZAREVA, N. F., Irkutsk State University imeni A. A. Zhdanov, Institute of Petrochemistry and Carbon Chemical Synthesis of Irkutsk State University

[Abstract] NMR spectroscopic methods were used to study solutions of complexes obtained by phosphorylation of compounds $RCH=CH_2$, where R=EtO, BuO, PhO and Ph, as well as $Me_2C=CH_2$, Me_3COH and Et_2O in nitrobenzene. The complexes were synthesized by mixing solutions of phosphorus pentachloride and the corresponding reagents at room temperature at a ratio of 2.5:1. References: 2 Russian.
[128-6508]

UDC 547.341

THE REACTION OF CYCLIC THIOPHENYLPHOSPHITES WITH CONJUGATE CARBONYL SYSTEMS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 462-463
manuscript received 9 Jul 79

RAGULIN, V. V., RAZUMOVA, N. A., ZAKHAROV, V. I., PETROV, A. A.,
Leningrad Institute of Technology imeni Lensovet

[Abstract] Ethylenethiophenylphosphites and 1, 3-propylene thiophenylphosphites are shown to react with conjugate carbonyl systems to form cyclic vinylphosphites. The formation of the vinylphosphites occurs under mild conditions, the condensation rate decreasing upon shielding of the β-carbon atom of the conjugate system. In these cases the formation of an intermediate with a 5-coordinate phosphorus atom was not observed. References: 2 Russian.
[128-6508]

UDC 547.241.23

THE REACTION OF 2-PHENYL-4-METHYL-1-PHENYLHYDRAZIDO-1, 2-DIHYDRO-1, 5, 2,3-PHOSPHAOXADIAZOL WITH BENZALDEHYDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 464-456
manuscript received 10 Jul 79

RAZHABOV, A., YUSUPOV, M. M., SEYTANIDI, K. L., YAGUDAYEV, M. R.,
Institute of Plant Chemistry, Uzbek Academy of Sciences

[Abstract] The authors have demonstrated that 2-phenyl-4-methyl-1-phenylhydrazido-1, 2-dihydro-1, 5, 2, 3-phosphaoxadiazol reacts with benzaldehyde mildly, with slight heating and, regardless of the ratio of the reagents, forms the product of attachment of two molecules of benzaldehyde -- 2-phenyl-4-methyl-1-(β-phenyl-β-oxybenzylhydrazino)-1-α-oxybenzyl-1, 2-dyhydro-1, 5, 2, 3-phosphaoxadiazol. References: 2 Russian.
[128-6508]

UDC 547.26'118

INTERACTION OF N-DIETHOXYPHOSPHORYLTRIFLUOROACETIMIDOYL CHLORIDE WITH TRIETHYLPHOSPHORITE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 465-466
manuscript received 28 Aug 79

SINITSA, A. D., KRISHCHTAL', V. S., KAL'CHENKO, V. I., MARKOVSKIY, L. N.,
Institute of Organic Chemistry, Ukrainian Academy of Sciences

[Abstract] The authors have found the first case of the "nitrogen perkov" reaction with the participation of organic compounds of fluorine. The interaction of imidoyl chloride with triethylphosphite apparently involves the formation of an intermediate imine, the reaction of which with triethylphosphite leads to N-(2, 2-difluoro-1-diethoxyphosphonyl) vinyl-N, N-bisdiethoxyphosphorylimide and N-ethyl-N-(2, 2-difluoro-1-diethoxyphosphonyl) vinylamido diethylphosphate. References 2: 1 Russian, 1 Western.
[128-6508]

UDC 547.241+547.36'118

VINYLOXYCHLOROPHOSPHORANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 466-467
manuscript received 10 Aug 79

GOLOLOBOV, YU. G., KOLODKA, T. V., Institute of Organic Chemistry,
Ukrainian Academy of Sciences

[Abstract] The authors produced the first representative of the vinyloxychlorophosphoranes by chlorination of vinyldichlorophosphite and trivinylphosphite synthesized from PCl_3 and 1, 1-dichloroacetone in the presence of triethylamine. The phosphoranes in question are colorless fluids which distill under vacuum without decomposition. This stability is apparently achieved by the high electronegativity of the chlorovinyl ester radical, its flat configuration and the "unsplittability" of the vinyl radical by halogens due to its electron saturation. References: 2 Russian.
[128-6508]

UDC 547.543.422.2

REACTION OF 2, 6-DIPHENYLPYRILLIUM PERCHLORATE WITH TRIBUTYLPHOSPHITE AND SODIUM DIBUTYLPHOSPHORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 467-468
manuscript received 25 Jun 79

BOYEV, V. I., DOMBROVSKIY, A. V., Nezhinskiy State Pedagogic Institute

[Abstract] The authors found that when 2, 6-diphenylpyrillium perchlorate is interacted with tributylphosphate and sodium iodide in nitromethane, Arbuzov regrouping occurs, forming (2, 6-diphenylpyranyl-4)-O, O-dibutylphosphonate. This same phosphonate was produced by the Michaelis-Bekker reaction by interacting sodium dibutylphosphoride with 2, 6-diphenylpyrillium perchlorate in benzene. References 2: 1 Russian, 1 Western.
[128-6508]

UDC 547.26'118

REACTION OF MONOISOCYANATES OF DIALKYLPHOSPHOROUS ACIDS WITH ETHYLBROMOPYRUVATE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 469-470
manuscript received 26 Jun 79

KONOVALOVA, I. V., BURNAYEVA, L. A., NOVIKOVA, N. K., PUDOVIC, A. N., Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] It was found that ethylbromopyruvate interacts with dialkylcyanatophosphites at low temperature in a medium of methylene chloride in two directions simultaneously: to form O-alkyl (α-carboethoxyvinyl) esters of isocyanatophosphoric acid with a yield of 50-55% and 2-alkoxy-2-oxo-3-alkyl-5-bromomethyl-5-carboethoxy-2-phosphaoxazoladine-4-ones with a yield of 18-20%. The reaction is diagrammed. References: 2 Russian.
[128-6508]

UDC 547.426.3+547.26'118

INTERACTION OF MONO- AND BISPHOSPHORYLATED ORTHOFORMIC ESTERS WITH PHOSPHORUS TRICHLORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 2, Feb 80 pp 470-471
manuscript received 13 Jul 79

GAZIZOV, M. B., RAZUMOV, A. I., KHAYRULLIN, R. A., Kazan'Institute of Chemical Technology imeni S. M. Kirov

[Abstract] The authors have studied the reaction of monophosphorylated (I) and bisphosphorylated (II) orthoformic esters with phosphorus trichloride. IR and NMR spectroscopic studies show that the two directions which would be expected -- substitution and breakdown of chloracetals formed occur to 34, 66% and 95.5, 4.5% in compounds (I) and (II), respectively. This indicates the great difference in the behavior of phosphorylated orthoformic esters and acetals in this reaction. References: 2 Russian.
[128-6508]

UDC 542.91:547.586.2:547.1'118

PHENYLALANINE DERIVATIVES CONTAINING ACYL GROUP OF STEREOISOMERIC N-[TETRAMETHYLDIAMIDO(THIO)PHOSPHORYL]-AND N-[DIMORPHOLIDO(THIO)PHOSPHORYL]-4-AMINOCYCLOHEXANECARBOXYLIC ACIDS

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 2, Feb 80 pp 386-390 manuscript received 14 Dec 78

L.A. PATOTSKENE, K. I. KARPAVICHYUS and I. L. KNUNYANTS, Institute of Metalorganic Compounds, USSR Academy of Sciences, Moscow, and Institute of Biochemistry, LitSSR Academy of Sciences, Vil'nyus

[Abstract] Because of the fact that non-alkylating tetraalkyldiamidophosphoryl derivatives of cyclohexylamine, morpholine and 4-aminocyclohexanecarboxylic acid show antitumor activity, ethyl esters of N-(tetramethyldiamido(thio)phosphoryl)- and N-(dimorpholido(thio)phosphoryl)-cis- and -trans-4-aminocyclohexanecarboxylic-DL-phenylalanine and their Na salts were synthesized. The starting materials were N-phtaloyl-cis- and N-phtaloyl-trans-4-aminocyclohexanecarboxylic acid and ethyl ester of DL-phenylalanine, which were condensed by means of dicyclohexylcarbodiimide. References 4: 3 Russian, 1 Western.
[127-7813]

UDC 542.952.1:547.1'118

ISOMERIZATION OF THE S-3-HYDROXYALKYL ESTERS OF CYCLIC PHOSPHORIC ACIDS

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian
No 2, Feb 80 p 477 manuscript received 12 Oct 79

O. N. NURETDINOVA, Institute of Organic and Physical Chemistry imeni
A..Ye. Arbuzov, Kazan' Branch of the USSR Academy of Sciences

[Abstract] The reaction of cyclic thiophosphoric acid with oxetane in ether solution yields 2-oxo-2-(3-mercaptopropoxy)-4, 5-dimethyl-1, 3, 2-dioxaphospholane, b.p. 119-122°/0.08 mm, d_4^{20} 1.2223, n_D^{20} 1.4739, and 2-oxo-2-(1-methyl-3-mercaptopropoxy)-4, 5-dimethyl-1, 3, 2-dioxophospholane, b.p. 118-122°/0.1 mm, d_4^{20} 1.1894, n_D^{20} 1.4704. The S-3-hydroxyalkyl esters in the series of acyclic and six and seven member cyclic phosphoric acids do not isomerize under these conditions. References 2: both Russian.
[127-7813]

UDC 541.49:535.243

SPECTROPHOTOMETRIC STUDY OF THE COMPLEX FORMATION OF POTASSIUM TETRATHIOCYANOPALLADITE WITH SOME ORGANOPHOSPHORIC COMPOUNDS IN NON-AQUEOUS SOLVENTS

Leningrad ZHURNAL OBSHICHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2186-2189 manuscript received 23 Nov 78

B. G. SODNOMOV, V. K. POLOVNYAK, A. D. TROITSKAYA, et al., Kazan' Chemical Technological Institute imeni S. M. Kirov

[Abstract] The complex formation of potassium tetrathiocyanopalladite with trivalent phosphorus compounds in ethanol and acetonitrile was studied. On the basis of UV spectral shifts it was concluded that $Pd(SCN)_2L_2$ type complexes have formed, where $L = P(C_6H_5)_3$, $C_6H_5P(OC_2H_5)_2$, $P(OC_2H_5)_3$ and $P(OC_6H_5)_3$. Spectrophotometric and thermodynamic characteristics of these compounds were reported. All of these complexes are stable in ethanol and acetonitrile; as a rule their stability in acetonitrile is slightly higher. References 7: 6 Russian, 1 Western.
[125-7813]

UDC 547.26'.118

REACTION OF 0,0-DIALKYLTHIOPHOSPHORIC ACIDS WITH COMPOUNDS CONTAINING CARBON-NITROGEN DOUBLE BONDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2189-2194 manuscript received 10 Jul 78

M. G. ZIMIN, N. G. ZABIROV and A. N. PUDOVIK, Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] The reactions of 0,0-dialkylthiophosphoric acids (I) with benzalmethylamine, benzimido ethyl ester, N-acetyltrichloroacetaldiimine and oxime were studied. Due to the double reactive sites, I can react with C=N type compounds either through the oxygen or sulfur, yielding addition products or salts with protonated nitrogen atoms. For example, I reacted with benzalmethylamine yields such a compound with protonated nitrogen which can be converted through 0,0-diisopropyl-S-(N-methylaminobenzyl)thiophosphate to 0,0-diisopropyl-S-benzylidene-bis-thiophosphate. Benzimido ethyl ester reacts with I to give 0,0-dialkyl-S-ethylthiophosphate. Finally, I reacts with the sulfur atom in N-acetyltrichloroacetate and with the oxygen in case of oximes. References 12: 9 Russian, 3 Western. [125-7813]

UDC 547.241:541.9

OXIDATION-REDUCTION REACTIONS OF PHOSPHINIC AND PHOSPHINOUS ACID HALIDES WITH TIN HALIDES LEADING TO THE FORMATION OF TIN TETRAHALIDE COMPLEXES WITH BIDENTATE ORGANOPHOSPHORIC LIGANDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2195-2201 manuscript received 11 Dec 78

A. A. MURATOVA, O. B. SOBANOVA, E. G. YARKOVA et al., Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] Phosphinic and phosphinous acid halides react with tin halides, breaking the RX bond and leading to the formation of tin tetrahalide complexes with organophosphoric ligands with P-O-P or P-P bands. These are the first examples of the oxidation of tin dihalides with organophosphoric compounds to create tetrahalides. In the presence of oxygen, the reaction of diphenyldimethylphosphinic and diphenylphosphinous acids with tin dihalides produces a complex of tin tetrahalide with the respective anhydride of phosphinic acid. These reactions are of the equilibrium type, in which all components are found in the equilibrium mixture, showing that the oxidation-reduction potentials of these compounds must be very close to each other. Figure 1, references 22: 10 Russian, 12 Western. [125-7813]

UDC 547.879

REACTION OF DIPHENYLTRICHLOROPHOSPHORANE WITH 1,1-DICYANO-2-AMINO-1-ALKENES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2201-2205 manuscript received 12 Dec 78

P. P. KORNUTA, L. S. KUZ'MENKO and L. N. MARKOVSKIY, Institute of Organic Chemistry, UkrSSR Academy of Sciences

[Abstract] 1,1-Dicyano-2-amino-2-trichloromethylethylene (I) was reacted with diphenyltrichlorophosphorane (II) along the general scheme of the phosphorylation of cyanoamino alkenes to yield a mixture of products from which 1,1-dicyano-2-diphenylchlorophosphazo-2-trichloromethylethylene and 4-chloro-5-cyano-2,2-diphenyl-6-trichloromethyl-1,3,2-diazaphosphorene were isolated. 1,1-Dicyano-2-amino-2-phenylethylene reacted analogously with II but the final product could not be isolated. In the presence of HCl, the acyclic 1,1-dicyano-2-diphenylchlorophosphazo-1-alkenes converted to cyclic 4-chloro-5-cyano-2,2-diphenyl-1,3,2-diazaphosphorenes. References 5: 4 Russian, 1 Western.
[125-7813]

UDC 547.241

HALOPHILIC REACTIONS OF CHLOROPHOSPHONIUM DERIVATIVES WITH LITHIUM ORGANIC COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70
pp 2205-2213 manuscript received 9 Nov 78

V. I. DMITRIYEV, V. V. TIMOKHIN and A. V. KALABINA, Institute of Petro- and Carbochemical Synthesis at the Irkutsk State University imeni A. A. Zhdanov

[Abstract] The reactions of $R_nP^+Cl_{4-n}Cl^-$ type chlorophosphonium compounds with lithium organic compounds (I) can proceed along a number of pathways. Therefore the reaction of chlorophosphoranes with I was studied in depth. The products of the reaction of $Ph_3P^+Cl\cdot Cl^-$ with phenyl lithium depend on the order in which the reagents are added. The substituents, the order of addition and the ratios of reagents were varied widely. The presence of chlorophosphonium cation in ionized phosphoranes makes it possible to reduce these compounds to trivalent phosphorus products under the influence of lithium organic compounds. Along with the reduction, a parallel process occurs - a nucleophilic reaction as the phosphorus atom forms the phosphonium salts. The reduction process was interpreted on the basis of a halophilic attack of a cryptocarbanion of the lithium organic compound on the chlorine atom covalently bound to phosphorus. References 18: 13 Russian, 5 Western.
[125-7813]

UDC 547.551.43'118.5:535.33

IR, NMR ^1H AND ^{31}P AND MASS SPECTRA OF PHOSPHORUS CONTAINING SUBSTITUTED CARBAMATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2213-2217 manuscript received 9 Nov 78

V. A. KOLESOVA and YU. A. STREPIKHEYEV, Moscow Chemical Technological Institute imeni D. I. Mendeleyev

[Abstract] The spectral data of the carbamates of phosphoric $[R^2R^3P(O)NR^4CO\text{-}XR']$ and phosphorous acid were analyzed. It was shown that the position of the carbonyl group absorption band depended on substituents at the phosphorus atom. Using the data of chemical shift of phosphorus δ_P and the position of phosphoryl group absorption bands, it was shown that the carbamate group in the phosphorylated carbamates resembled the alkoxyl substituent at the phosphorus atom in its overall manifestation of electronic properties. Study of the mass spectra of phosphorylated N-substituted carbamates showed a very high stability of the molecular ions of the phosphorylated N-phenylcarbamates under conditions of electron impact, in contrast to N-alkyl carbamates, which showed a low intensity of molecular ions. References 7: 5 Russian, 2 Western.
[125-7813]

UDC 547.412.21+547.26'118

REACTIONS OF HALOCYANOMETHANES AND HALOPHENYL METHANES WITH TRIETHYL PHOSPHITE AND TRIPHENYL PHOSPHINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2217-2223 manuscript received 15 Dec 78

V. P. KUKHAR', YE. I. SAGINA and N. G. PAVLENKO, Institute of Organic Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] The reaction of substituted trichloromethanes $R\text{-}CCl_3$ with trialkylphosphites depends on the radical R. When R is a phenyl group, the reaction takes place only upon radical initiation; electron-accepting R's make it possible for the reaction to go along the Arbuzov rearrangement. Introduction of additional cyano groups into the molecule increases the reactivity of halomethanes towards the phosphites. Reaction of dihalodicyanomethanes with triphenylphosphine yields 1-triphenylphosphazo-1,2-dihalo-2-cyanoethylenes, while the monohalodicyanomethanes produce phosphonium salts. In general, a strong nucleophile like triphenylphosphine attacks the halogen atom, following which a new phosphorus-nitrogen

bond is formed. Triethylphosphite principally attacks the central carbon atom of the dihalodicyanoalkanes. Reactions of triethylphosphite with diphenyldichloromethane and diphenylchloroacetonitrile occur by a radical scheme. References 15: 7 Russian, 8 Western.
[125-7813]

UDC 547.241

REACTION OF PERFLUOROIODOALKANES WITH TRIALKYLPHOSPHITES. 2 COMMUNICATION. CALORIMETRY, NMR ^{19}F AND IR SPECTRA

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2223-2225 manuscript received 26 Dec 78

A. V. GARABADZHIU, V. A. KUZNETSOV, V. I. SHIBAYEV, et al., Leningrad Technological Institute imeni Lensovet

[Abstract] Trialkylphosphites form 1:1 complexes with perfluoroiodoalkanes. Heat effects, IR and NMR ^{19}F spectra were determined for equimolar mixtures of starting reagents. The strength of the complex correlated with the induction σ_I^φ, resonance σ_R^φ, and steric E_S^0 constants of the phosphorus atom substituents. The $\Delta\delta$ (CF_2I) and $\Delta\delta$(CFI) values changed in correspondence to the strength of the complexes formed. In the IR spectra, a band at 315-320 cm^{-1} was identified as the P-I bond valence vibration band. References 6: 5 Russian, 1 Western.
[215-7813]

UDC 547.341

CYCLOHALOGENATION OF 3-METHYL-1,2,4-PENTATRIENE-1-PHOSPHONIC ACID ESTERS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2225-2230 manuscript received 22 Sep 78

KH. M. ANGELOV, M. KIRILOV, B. I. IONIN, et al., Higher Pedagogical School Shumen, National Republic of Bulgaria, Leningrad Technological Institute imeni Lensovet

[Abstract] The effect of the vinyl group in position 3 of an allene system on cyclohalogenation of allene phosphonates was studied. This was done by halogenating dialkyl esters of 3-methyl-1,2,4-pentatriene-1-phosphonic acid in which the vinyl group was directly connected to the reactive center C^3 of the allenic phosphonate system ($P-C^1=C^2=C^3$). It was established that the allenephosphonate bond system O=P-C=C-C participates in this reaction, leading to a cyclization with the formation of

2-alkoxy-4-halo-5-ethenyl-5-methyl-2-oxo-1,2-oxaphosphol-3-enes. The reaction was carried out at -8 to -12° C in non-polar solvents (CCl_4, $CHCl_3$, C_2H_4, etc.) The products are colorless liquids which gradually turn yellowish due to polymerization. Figures 2, references 5: all Russian.
[125-7813]

UDC 542.91:547.241

SYNTHESIS AND SOME PROPERTIES OF DIALKYLAMIDOALKYL-, CYCLOALKYL- AND ARYLPHOSPHONOUS ACID CHLORIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79 pp 2230-2236 manuscript received 11 Dec 78

N. A. ANDREYEV and O. N. GRISHINA, Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the USSR Academy of Sciences

[Abstract] Pure amidophosphonous acid chlorides (I) were obtained by reacting ultrapure diamides with freshly distilled dichlorophosphines. Their hydrolysis was studied. It was established that incomplete hydrolysis of I yields cyclopolyphosphines and polyphosphonates. In the presence of an acceptor of HCl, I hydrolyzes through the stages of the formation of amidophosphonous acids and polyphosphonites; phosphonous acid chlorides are formed when there is no HCl acceptor, and complete hydrolysis yields phosphonous acids. Alcoholysis of I leads to the formation of complete esters, amidoesters and diamides of phosphonous acids. It was shown that hydrolysis of the diamides of phosphonous acids goes through the protonation of the nitrogen atom, followed by a shift of the equilibrium towards the amine and amidophosphonous acide chloride. This is because the latter reacts faster with water than with the amine. References 17: 11 Russian, 6 Western.
[125-7813]

UDC 547.811

SYNTHESIS AND STRUCTURE OF DIALKOXYTHIOPHOSPHORYL(BISALKOXYCARBONYL-, BISACETYL-, ALKOXYCARBONYLACETYL)METHYLDI- AND TRISULFIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2236-2241 manuscript received 12 Jun 78

B. A. KHASKIN, N. A. TOLMACHEVA, T. I. KOROLEVA, et al., All-Union Scientific Research Institute of Chemical Plant Protective Agents

[Abstract] Bis(dialkoxythiophosphoryl)tri- and -tetrasulfides reacted with equimolar quantities of sodium derivatives of malonic ester, acetoacetic ester and acetylacetone, yield dialkoxythiophosphoryl(bisalkoxycarbonyl-, bisacetyl-, alkoxycarbonylacetyl)-methyldi- and trisulfides and respective salts of phosphoric dithioacids. It was shown that these compounds exist in the enolic form. When excess Na derivatives of β-dicarbonyl compounds are used, the products consist of respective dicarbonylmono- and disulfides. References 6: 5 Russian, 1 Western.
[125-7813]

UDC 541.57:546.11:547.1'118

THE STUDY OF THE ASSOCIATION OF PHOSPHORYL COMPOUNDS WITH PROTON DONORS BASED ON THE γ(P=O) FREQUENCY IN THEIR SPECTRA

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70
pp 2241-2245 manuscript received 28 Sep 78

V. YE. BEL'SKIY and L. KH. ASHRAFULLINA, Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the USSR Academy of Sciences

[Abstract] The formation of intermolecular hydrogen bonds leads to a lowering of the valence vibration frequencies of the phosphoryl group γ(P=O) (I). The relationship between I and ΔH for a series of phosphoryl compounds and proton donors was studied. A general tendency was noted for a proportional change of these values. The slopes of these linear correlations between ΔH and I depend on the nature of the phosphoryl compound. As the complexes become weaker, the degree of charge transfer is lowered, as is the electrostatic interaction between the IR components; therefore the above relationships represent only empirical correlations between spectral and thermodynamic parameters. They do not explain the nature of weak H-bonded complexes. Figures 3, references 11: 7 Russian, 4 Western.
[125-7813]

UDC 547.341

FORMATION OF BICYCLIC PHOSPHORUS CONTAINING HETEROCYCLES DURING CHLORINATION OF DIALKYL ESTERS, 1-CHLORO-2-(1-CYCLOHEXENYL)-ETHENEPHOSPHONIC ACID

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70
pp 2381-2382 manuscript received 27 Sep 78

KH. M. ANGELOV, V. KH. KHRISTOV, B. I. IONIN, et al., Higher Pedagogical School Shumen, National Republic of Bulgaria, Leningrad Technological Institute imeni Lensovet

[Abstract] Chlorination of 2-chloro-2-(1-cyclohexenyl)-ethenephosphonic acid leads to the formation of six membered phosphorus containing heterocycles: 4,5-dichloro-2-alkoxy-2-oxo-1-oxa-2-phosphabicyclo[4,4,1]dec-3-enes. Their structures were supported by NMR data. Two Russian references.
[125-7813]

UDC 547.79+546.183

INTRAMOLECULAR HETEROCYCLIZATION OF PHOSPHAZO COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70 p 2383
manuscript received 5 Mar 79

[Abstract] Heating phosphazo compounds obtained by the Schtaudinger imination of 1,3-dichloropropen-1-yl-2-phosphites leads to an intramolecular heterocyclization, and the formation of 2-oxo-2-ethoxy-3-phenyl-5-chloromethylene-1,3,2-oxazaphospholane, m.p. 100-101° C and 2-diethylamino-2-oxo-3-phenyl-5-chloromethylene-1,3,2-oxazaphospholane, m.p. 108-109° C. References 3: all Russian.
[125-7813]

UDC 547.419

S-PHOSPHORYLATION OF DICHLOROACETIC ACID ESTERS WITH PHOSPHORUS TRICHLORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70 p 2384
manuscript received 10 Apr 79

D. M. MALENKO and YU. G. GOLOLOBOV, Institute of Organic Chemistry, USSR Academy of Sciences

[Abstract] It was established that acid properties of the -CH bonds of dichloroacetic acid esters are sufficiently strong for their direct C-phosphorylation by phosphorus trichloride in the presence of triethylamine. An equimolar mixture of methyldichloromethane, triethylamine and a double excess of PCl_3 were kept at room temperature for 4 days, diluted with ether, filtered, and distilled off to yield methoxycarbonyldichloromethyldichlorophosphine, b.p. 52-53°/0.05 mm, n_D^{20} 1.5017, d_4^{20} 1.5749. The ethoxy analogue (b.p. 60°/0.05 mm, n_D^{20} 1.5022, d_4^{20} 1.4850) and the butoxy derivative (b.p. 71-72°/0.05 mm, n_D^{20} 1.4981, d_4^{20} 1.3748) were obtained in a similar manner. Two Russian references.
[125-7813]

UDC 547.341+547.333

PHOSPHORUS CONTAINING INAMINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70
pp 2385-2386 manuscript received 15 Mar 79

V. A. GARIBINA, A. V. DOGADINA, B. I. IONIN et al., Leningrad Technological Institute imeni Lensovet

[Abstract] The reaction of chloroacetylene phosphorane with dealkylamines yields acetylenic dialkylaminophosphonates. Analogous products can be obtained by heating to 150-160° C a phosphonate with excess triethylamine in a sealed tube. Two products are described: dipropyl ester of dimethylaminoacetylenephosphonic acid, b.p. 153°/0.5 mm, n_D^{20} 1.4729, d_4^{20} 1.0385 and dipropyl ester of diethylaminoacetylenephosphonic acid, b.p. 165°/0.5 mm, n_D^{20} 1.4689, d_4^{20} 1.0245. References 4: 2 Russian, 2 Western.
[125-7813]

UDC 547.241+547.421.4/.15

SYNTHESIS OF CYCLIC PHOSPHORYLATED ACETALS - DERIVATIVES OF TETRAHYDROPYRANE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70 p 2387 manuscript received 7 May 79

M. B. GAZIZOV, A. I. RAZUMOV, I. KH. GIZATULLINA, et al., Kazan' Chemical-Technological Institute imeni S. M. Kirov

[Abstract] A simple synthetic method was developed for tetrahydropyrane derivatives of cyclic acetals, based on the room temperauure reaction of 2,3-dihydropyrane with phosphorylated α-hydroxy compounds, catalyzed with HCl. The following products have been reported (R, R', b.p.°C/mm, d_4^{20} and n_D^{20} being reported): CH_3, H, 93/0.03, 1.1947, 1.4535; C_2H_5, H, 94/0.02, 1.1241, 1.4485; CH_3, CH_3, 79/0.025, 1.1593, 1.4510; C_2H_5, CH_3, 104/0.03, 1.0954, 1.4450. No references.
[125-7813]

UDC 547.241

EFFECT OF THE RING SIZE ON REACTIVITY OF CYCLOPOLYPHOSPHINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79 pp 2387-2388 manuscript received 14 Mar 79

I. G. MASLENNIKOV, A. N. LAVRENT'YEV and YE. G. SOCHILIN, Leningrad Technological Institute imeni Lensovet

[Abstract] Through the study of the reaction of cyclopolyphosphines with fluorodialkanes, it was established that the ring size of cyclopolyphosphines affects their reactivity. To obtain secondary nonsymmetrical iodophosphines by the reaction of R_FI with cyclopolyphosphines, both tetramers and pentamers could be used when R = CF_3. With pentafluoroethylcyclopolyphosphines R = C_2F_5, only the low boiling form of cyclopolyphosphine should be used in the reaction. References 9: 3 Russian, 6 Western.
[125-7813]

UDC 547.241

SYNTHESIS OF TRIVALENT PHOSPHORUS COMPOUNDS CONTAINING α-CARBOALKOXYMETHYL GROUP

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70 p 2389
manuscript received 26 Mar 79

I. A. STEPANOV, A. YU. PLATONOV and V. N. CHISTOKLETOV, Leningrad Technological Institute of Cellulose-Paper Industry

[Abstract] The reaction of P^{III} acid chlorides with lithiumalkyl acetate yields carboalkoxymethylphosphonous acid derivatives. For example, a THF solution of ethyl acetate was added dropwise (with stirring) to a solution of 12.7 g of lithium-hexamethyldisilazane etherate in 50 ml THF at -68° C, followed by 11.9 g diethylchlorophosphite. The mixture was warmed to room temperature, the solvents were evaporated and the product distilled to yield diethyl ether of carboethocymethylphosphonous acid, b.p. 98-102°/11 mm, n_D^{20} 1.4375. References 7: 5 Russian, 2 Western.
[125-7813]

UDC 547.26'118

SYNTHESIS OF 1,8-NAPHTYLENE PHOSPHITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79 p 2390
manuscript received 11 Mar 79

E. YE. NIPANT'YEV, YE. YE. MILLIARESI, N. G. RUCHKINA, et al., Moscow State Pedagogical Institute imeni Lensovet

[Abstract] Various phosphates were synthesized in which the valence angle O-P-O of the phosphates was larger than a tetrahedral angle. Treatment of 1,8-dihydroxynaphtalene (I) with PCl_3 in ether and THF gave 1,8-naphtylenechlorophosphite (II) m.p. 135-137° C, b.p. 193-195°/2 mm, which, treated with ethanol in presence of $(C_2H_5)_3N$, gave 1,8-naphtylenethylphosphite, b.p. 132-134°/2 mm, n_D^{20} 1.6029. Hydrolysis of II yields 1,8-naphtylenephosphite, m.p. 106-107° C, b.p. 186-188°/2 mm. With $C_6H_5OPCl_2$, I yields 1,8-naphtylenephenylphosphite, m.p. 54-55°, b.p. 178-180°/1 mm, and with $(C_2H_5)_2NPCl_2$ - 1,8-naphtylenediethylamidophosphite, b.p. 173-175°/2 mm, n_D^{20} 1.6080. References 2: 1 Russian, 1 Western.
[125-7813]

UDC 547.414:547.241

A SYNTHETIC METHOD FOR THE PRODUCTION OF NITROPHOSPHOLENE OXIMES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 70
pp 2390-2391 manuscript received 27 Mar 79

V. M. BERESTOVITSKAYA, D. A. YEFREMOV and V. V. PEREKALIN, Leningrad State Pedagogical Institute imeni A. I. Gertsen

[Abstract] Oximes of nitrogen containing phospholenones were obtained by the nitration of 1-oxo-1-alkoxy-3-methyl-3-phospholenes with nitrogen tetraoxide in diethyl ether, followed by the treatment of this reaction mixture with water. The product, 1-oxo-1-alkoxy-2-oximino-3-methyl-3-phospholene, is a yellow crystalline compound, soluble in water. IR, UV, NMR and PMR spectral data for characteristic peaks was reported. Two Russian references.
[125-7813]

UDC 547.241

SYNTHESIS OF N-ARYLAMINO DERIVATIVES OF BENZYLDIETHYLPHOSPHINE OXIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
p 2392 manuscript received 12 Mar 79

N. S. KOZLOV, V. D. PAK and YE. A. BRITAN, Permsk Agricultural Institute imeni Academician D. N. Pryanishnikov

[Abstract] The reaction of aromatic Schiff bases with diet diethylchlorophosphine and water in a benzene-pyridine mixture yields α-(N-arylamino)-benzyldiethylchlorophosphine oxide in rather low quantities. The following oxides have been synthesized: α-(N-p-carbomethoxyphenylamino)benzyldiethylphosphine, m.p. 186-188° C, and α-(N-p-carboethoxyphenylamino)benzyldiethylphosphine, m.p. 122-124° C. References 4: 3 Russian, 1 Western.
[125-7813]

UDC 547.26'118

REACTION OF N,N'-DIACETYL-1,4-DIAMINO-2,3-DIHYDROXYBUTANE WITH HEXAETHYLTRIAMIDE OF PHOSPHOROUS ACID

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2393-2394 manuscript received 18 Sep 78

L. I. MIZRAKH, L. YU. POLONSKAYA and N. V. ULANOVSKAYA

[Abstract] N,N'-diacetyl-1,4-diamino-2,3-dihydroxybutane, m.p. 182-183, obtained by acetylation of 1,4-diamino-2,3-dihydroxybutane, was reacted with hexaethyltriamidophosphite to yield 5,5'-bis(2-diethylamido-3-acetyl-1,3,2-oxazaphospholane, m.p. 204-207° C. One Russian reference.
[125-7813]

UDC 547.241

SOME COMPLEXES OF HEXAALKYLTRIAMINOBENZYLPHOSPHONIUM SALTS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2394-2395 manuscript received 24 Jan 79

L. I. MIZRAKH, L. YU. POLONSKAYA and T. M. IVANOVA

[Abstract] Hexaethyl- and hexamethyltriamides of phosphorus acid can be alkylated with benzyl chloride forming hexaethyltriaminobenzylphosphonium chloride, m.p. 125-127° C and hexamethyltriaminobenzylphosphonium chloride, m.p. about 180° C. Both salts are capable of forming stable complexes, when heated in C_2H_5OH with the complexing agent. No references.
[125-7813]

UDC 541.65+547.556.33

THE EFFECT OF PHOSPHORUS CONTAINING SUBSTITUENTS ON THE COLOR OF AZODYES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79
pp 2395-2396 manuscript received 15 Feb 79

G. P. PAVLOV, V. A. KUKHTIN, V. V. KORMACHEV, et al., Chuvash State University imeni I. N. Ul'yanov

[Abstract] A number of 4-dimethylaminoazobenzene derivatives were synthesized and their electronic spectra were studied. Analysis of the σ_y values of these compounds showed that the effect of both the phosphorus

containing and non-phosphoric substituents on the color of azodyes corresponded to their Hammet constants. A similar comparison of electronic spectra of p-$YC_6H_4NH_2$ compounds failed to show any correlation between γ_{max} and corresponding σ^- constants. This difference in the behavior of organophosphoric substituents may be due to different interactions of phosphorus atoms with various π-systems. References 11: 8 Russian, 3 Western.
[125-7813]

UDC 547.(241+245)

THE SPATIAL STRUCTURE OF 2,2-DIMETHYL-5-ALKYL-5-THIONO-1,3,2,5-DIOXASILAPHOSPHORINANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 49 No 10, Oct 79 pp 2399-2400 manuscript received 11 Mar 79

I. I. PATSANOVSKIY, E. A. ISHMAYEVA, N. M. KUDYAKOV, et al., Kazan' State University imeni V. I. Ul'yanov-Lenin, Irkutsk Institute of Organic Chemistry, Siberian Branch of the USSR Academy of Sciences

[Abstract] Dipole moments of the title compounds were determined for $R=CH_3$, C_3H_7, and iso-C_3H_7 in CCl_4 at 25° C (3.93, 3.95, 4.08 respectively). At equilibrium, these compounds appeared to be in the chair conformation, with a predominantly e orientation of P=S. References 8: 6 Russian, 2 Western.
[125-7813]

UDC 547.26'118

INTERACTION BETWEEN DITHIOACIDS OF PHOSPHORUS AND THEIR ANILINE SALTS, ON THE ONE HAND, AND THE ISONITRILES, ON THE OTHER

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1979 pp 2651-2661 manuscript received 14 Nov 78

ZIMIN, M. G., ZABIROV, N. G., NIKITINA, V. I. and PUDOVIK, A. N., Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] As part of their research into rearrangements accompanied by the 1,3-S→N migration of phosphoryl groups, the authors investigated the reactions between dithioacids of phosphorus and isonitriles. It was found that these reactions result in the formation of S-(carbylamino)-dithiophosphates which rearrange themselves into N-thiophosphorylated thioformamides. These, in their turn, when heated, are prone to back-isomerization into ethers of S-(carbylamino)dithiophosphoric acid.

On reacting with anilines, the S-(carbylamino)dithiophosphates display cleavage of the C-S and P-S bonds, with the formation of dithiophosphate salts of N,N'-diarylformamidines and dialkyl ethers of anilidithiophosphoric acid. The course of the reactions of isonitriles with dialkyldithiophosphoric acids depends on the presence of anilines in the reaction medium. The principal products of the interaction in the ternary mixture (isonitrile+dithioacid+aniline) are the dithiophosphatic salts of N,N'-diarylformamidines. The reactions between dithiophosphatic salts of anilines and arylisonitriles result in the formation of dithiophosphatic salts of N,N'-diarylformamidines and dialkyl ethers of anilidithiophosphoric acid. References 16: 11 Russian, 5 Western.
[124-1386]

UDC 541.63:547.1'118

SPATIAL STRUCTURE OF PHOSPHORUS-CONTAINING HETEROCYCLIC RINGS. XIV. INTERNAL ROTATION OF THE PHENYL RING IN 2-PHENYL-1,3,2-DIOXAPHOSPHORINANES AS DETERMINED BY THE KERR EFFECT METHOD

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1979 pp 2661-2668 manuscript received 10 Nov 78

ARSHINOVA, R. P., GUBAYDULLIN, R. N. and MUKMENEV, E. T., Scientific Research Chemical Institute imeni A. M. Butlerov, Kazan' State University; Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Affiliate of the USSR Academy of Sciences

[Abstract] The structural and electro-optical parameters of the bonds of trivalent phosphorus were investigated by the isoanisotropic chart method on utilizing the data of the related methods of physics (the Kerr effect and the depolarization of Rayleigh light scattering). It was established that the major axes of the ellipsoid of polarizability of the P-Ph group are determined by the reciprocal position of the axis of the undivided electron pair P^{III} and the π-system of the benzene ring. The rotation of the aryl group in the 6-atomic cycles is associated with steric interactions with the atoms of the cycle. An axial position of the phenyl in 2-phenyl-1,3,2-dixoaphosphorinanes results in a conformation in which the plane of symmetry of the molecule lies at right angles to the plane of the benzene ring. For 4-coordinated phosphorus compounds a more preferable conformation is one with an equatorial position of phenyl in the plane of symmetry of the molecule. 1 figure; 33 references: 10 Russian, 23 Western.
[124-1386]

UDC 547.341:547.379

REACTION BETWEEN ORGANIC (CHLOROETHINYL)SULFIDES AND TRIALKYLPHOSPHITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1979 pp 2668-2670
manuscript received 5 Apr 79

MIRSKOVA, A. N., LUTSKAYA, N. V. and VORONKOV, M. G., Irkutsk Institute of Organic Chemistry, Siberian Affiliate of the USSR Academy of Sciences

[Abstract] Organic (chloroethinyl)sulfides were reacted with trialkylphosphites by the Arbusov rearrangement method, and formed esters of organic thioethinylphosphonic acids (I-VI). The reaction was accomplished by mixing chloroacetylenes with trialkylphosphites in an equimolar ratio at 18-20° C, with spontaneous heating of the reaction mixture to 60-90° C. The structure of compounds I-VI was established by methods of PMR and IR spectroscopy. The physico-chemical constants of these compounds are tabulated. References: 5 Russian.
[124-1386]

UDC 547.34.126.118.07

BASICITY OF PHOSPHORUS-CONTAINING IMINOESTERS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1979 pp 2720-2724
manuscript received 24 Jul 78

SHISHKIN, V. YE., MEDNIKOV, YE. V., NO, B. I. and SHISHKINA, N. V., Volgograd Polytechnical Institute

[Abstract] The potentiometric titration method was used to determine the constants pK_α for compounds of the general form $(R')(R'')P(O)RC(=NH)OC_2H_5$ in the phosphate, phosphonate, and phosphinate series, as well as for phosphine oxides, in the presence of non-aqueous solvents such as nitromethane and dimethylsulfoxide. Since the compounds dissolved in nitromethane represent stronger bases than those dissolved in dimethylsulfoxide, the experimental findings on the former compounds were used to estimate the basicity of iminoesters in water. The investigated iminosters proved to display a weaker basicity than aliphatic amines and a stronger basicity than aniline and pyridine. The introduction of a phosphorus-containing fragment into the molecule of an iminoester results in reducing its basicity. However, the basicity of phosphorus-containing iminoesters increases upon removal of the phosphoryl group from the iminoester group. A linear correlation between pK_α and $\Sigma\sigma^*$ in nitromethane was established for the ethyl esters of phosphorylated iminoacetic acids. These findings are of interest considering that many physico-chemical properties, especially thermostability, are associated with basicity, and that phosphorylated iminoesters represent a material for the synthesis of many classes of biologically active organophosphorus compounds. References 7: 6 Russian, 1 Western.
[124-1386]

UDC 547.234.1+547.241+541.127

KINETICS OF THE REACTIONS BETWEEN THE HYDRAZIDES AND ALPHA-ETHYLHYDRAZIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1979 pp 2763-2766
manuscript received 2 Feb 79

YANCHUK, N. I., Ternopol' State Pedagogical Institute

[Abstract] Considering that the hydrazides of diarylphosphinic, 0,0-diarylphosphoric, and 0,0-diarylthiophosphoric acids reacting with phenylisocyanate are known to display an enhanced reactivity due to the alpha-effect, it was assumed that organophosphorus compounds of hydrazine display an enhanced reactivity in reactions with a particular type of substrate. This assumption was verified by investigating the kinetics of the reactions of the hydrazides and alphaethylhydrazides of aromatic acids of phosphorus with phenylisothiocyanate in benzene. It was found that then the alpha-effect markedly decreases, as compared with the increase in alpha-effect when phenylisocyanate is used instead of phenylisothiocyanate; this may be attributed to the smaller capacity of the sulfur atom to form a hydrogen bond, which reduces the possibility of the formation of a cyclic transition complex. Thus, the alpha-effect is largely determined by the structure of the transition state. The dependence of the alpha-effect on the structure of the electrophilic reagent demonstrates that organophosphorus compounds of hydrazine display a higher reactivity in reactions with a particular type of substrate. References 16: 11 Russian, 5 Western.
[124-1386]

UDC 547.26'118

ADDITION OF DIETHYLPHOSPHITE TO ACROLEIN DIETHYLACETAL

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian No 12, 1979 pp 2777-2778
manuscript received 16 Apr 79

PETROV, K. A., CHAUZOV, V. A. and CHERNOBROVKINA, L. P.

[Abstract] The radical addition of diethylphosphite to acrolein acetal results in the formation of a bisphosphorylated ether with a yield of 26%. It is shown that then that ether is obtained from the combining of the phosphite with an intermediate--a phosphorylated vinyl ether representing the sole product of the reaction upon lowering the reaction temperature. The analytic findings on the thus obtained biphosphorylated ether (ethoxy-2,3-bisdiethoxyphosphinylpropane) are as follows: b.p. 161-168° C (2 mm Hg), n_D^{20} 1.4502. Actual composition (in %): C, 43.22; H, 8.05; P, 17.13. $C_{13}H_{30}O_7P_2$. References 2: both Russian.
[124-1386]

UDC 547.241+546.362

UNSATURATED ORGANOPHOSPHORUS COMPOUNDS IN THE HETEROCYCLIC SERIES. II. SYNTHESIS OF 2, 6-DIPHENYL-3-METHYL-4-DIALCOXYTHIOLPHOSPHONOETHYNYL-PIPERADINE-4-OLS

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR - SERIYA KHIMICHESKAYA in Russian, No 6, 1979, pp 59-61, manuscript received 4 Jul 79

GODOVIKOV, N. N., ABDULLAYEV, N. B., ABIYUROV, B. D., Institute of Chemical Sciences, Kazakh Academy of Sciences, Alma-Ata

[Abstract] Due to the contradictory nature of data in the literature on the direction of the reaction of alkylation of salts of dialkylthiophosphoric acids, the authors studied the alkylation of the salts by individual isomers of 2, 6-diphenyl-3-methyl-4-(2-bromoethynyl)-piperadine-4-ols. Alkylation of potassium salts of dialkylthiophosphoric acids with bromoacetelyne alcohols was performed in the corresponding alcohol with heating for 4 hours, producing stereoisomer 2, 6-diphenyl-3-methyl-4-dialcoxythiolphosphonoethynyl-piperadine-4-ols with yields of 40-80%. Thin-layer chromatography on activated aluminum oxide demonstrated the individuality of the products produced. References 10: 8 Russian, 2 Western.
[115-6508]

UDC 547.27/37:542.91

A STUDY OF THE TRANSFORMATION OF DIALKYL ESTERS OF 1-METHYL-1, 2-EPOXY-ETHYLPHOSPHINIC ACID

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR - SERIYA KHIMICHESKAYA in Russian No 6, 1979 pp 55-58 manuscript received 16 Mar 78

GAFUROV, YE. K., UYZBAYEV, K. M., KAZANTSEV, A. V., Karaganda State University

[Abstract] A study was made of certain transformations of the diakyl esters of 1-methyl-1, 2-epoxyethylphosphinic acid in order to determine the opening of the epoxy ring and the production of phosphorus-containing alcoxy alcohols and aminoalcohols. The reaction of these compounds with alcohols, aniline and hydrochloric acid was studied. It was found that they interact with alcohols in the presence of boron trifluoride, with aniline in the presence of small quantities of water. The epoxy ring was found to open on the side of the less sterically hindered β-carbon atom. References: 4 Russian.
[115-6508]

UDC 547.241+546.362+17

UNSATURATED ORGANOPHOSPHORUS COMPOUNDS IN THE HETEROCYCLIC SERIES. IV. SYNTHESIS OF 2, 6-DIPHENYL-3-METHYL-4-(2-DIALKYLPHOSPHONETHENYLIDENE)-PIPERADINES

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOR SSR - SERIYA KHIMICHESKAYA in Russian No 6, 1979 pp 62-65

GODOVIKOV, N. N., ABDULLAYEV, N. B., ABIYUROV, B. D., Institute of Chemical Sciences, Kazakh Academy of Sciences, Alma-Ata

[Abstract] Continuing the studies on the synthesis of unsaturated organophosphorus compounds in the heterocyclic series, the authors used acetylene carbinols of the piperadine series to synthesize phosphorus-containing allenes. Using individual isomers of bromoacetylene alcohols and a number of dialkylchlorophosphites, they produced 2, 6-diphenyl-3-methyl-4-(2-dialkylphosphonethenylidene)-piperadines differing in melting point, chromatographic characteristics and spectroscopic parameters. Figure 1, References 6: 5 Russian, 1 Western.
[115-6508]

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